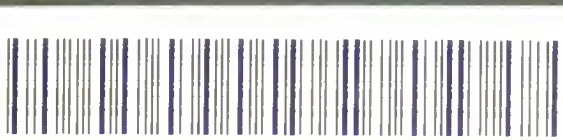
DISEASES OF WOMEN

MACNAUGHTON-JONES

The University Library
Leeds

Medical and Dental
Library

HENRY WALKER
NEW AND OLD BOOKSELLER
AND BOOKBINDER
37 BRIGGATE LEEDS


30106 004250691

STORE
WP 140
MAC

LEEDS & WEST RIDING
MEDICO-CHIRURGICAL SOCIETY

PRACTICAL MANUAL

DISEASES OF WOMEN

AND

UTERINE THERAPEUTICS.

For Students and Practitioners.

BY

H. MACNAUGHTON-JONES, M.D., M.Ch.

MASTER OF OBSTETRICS (HONORIS CAUSA), ROYAL UNIVERSITY OF IRELAND;
FELLOW OF THE ROYAL COLLEGES OF SURGEONS OF IRELAND AND EDINBURGH;
FORMERLY UNIVERSITY PROFESSOR OF MIDWIFERY AND DISEASES OF WOMEN AND CHILDREN
AND EXAMINER IN MIDWIFERY AND DISEASES OF WOMEN AND
CHILDREN IN THE ROYAL UNIVERSITY OF IRELAND.

SEVENTH EDITION, REVISED AND ENLARGED.

WITH 565 ILLUSTRATIONS.

PARIS - LONDON - MADRID
MENS SANA CORPORE SANO

LONDON:
BAILLIÈRE, TINDALL AND COX,
20 & 21, KING WILLIAM STREET, STRAND.
1897.

Digitized by the Internet Archive
in 2015

602872

https://archive.org/details/b21520069

LEEDS & WESTRIDING
MEDICO-CHIRURGICAL SOCIETY

PREFACE.

ONLY within the past few years has the rapidly-increasing knowledge, consequent upon the synchronous and universal investigation and observation, given to the study of diseases of women a coherent and concrete shape. It must be remembered that the greater part of the gynæcology of to-day is the result of a growth of some fifteen or twenty years' duration, and that much of its pathology has only been brought to light, and its operative technicology devised, within the past few years.

When the sixth edition of this work was placed in the hands of the profession, just two years since, I then endeavoured to make it as complete a summary of the subject as was possible at the time, and I must here acknowledge with gratitude the generous criticisms of that edition in British, American, Australian, Indian, and Continental journals. When, however, I was called upon to write the present edition, I found in how many particulars the book required both revision and addition in order to make it a systematic manual. The literature of the subject has grown apace, and the last three years have been especially

prolific in pathological records and practical operative procedures of great value. Therefore it is, that no previous issue of this work has undergone such complete revision and reconstruction as the present one, both in the rearrangement of the order in which the subject is dealt with, the numerous additions which have been made to the text, and in the large number of illustrations it contains. I have endeavoured to the best of my ability to give it a thoroughly cosmopolitan character, and, while not hesitating to clearly express my own views and experience, to make it an epitome, up to the date of its issue from the press, of the teaching and opinions of the greatest living gynæcologists. It will be found that throughout its pages the fullest recognition has been given to their labours. At the end of the work, also, is a complete list of all the authorities referred to.

Due acknowledgment is everywhere accorded to those who have courteously lent me their *clichés* for reproduction. Mr. Bland Sutton has kindly revised the two chapters originally written by him on 'Tubal Pregnancy' and the 'Pathology of Ovarian Cystoma.' My publishers have, with their usual generosity, met my every wish, and I take this opportunity of according them my cordial thanks.

H. MACNAUGHTON-JONES.

141, HARLEY STREET, W.,
January, 1897.

LEEDS & WEST RIDING
MEDICO-CHIRURGICAL SOCIETY

CONTENTS

CHAPTER I.

ANATOMICAL AND CLINICAL.

PAGES

Introductory—Anatomical facts bearing on gynæcological practice 1-36

CHAPTER II.

FIRST STEPS OF EXAMINATION OF A CASE.

Method of inquiry—All appliances necessary for diagnosis—Directions for the use of the uterine sound, tents, dilators; the administration of anæsthetics 37-80

CHAPTER III.

FIRST STEPS OF EXAMINATION OF A CASE (*continued*).

Various methods of examination—The value of rectal exploration—Inquiry into the character of discharges—The microscope and ophthalmoscope in diagnosis—Exploratory incision, etc. 81-109

CHAPTER IV.

SOME MINOR GYNÆCOLOGICAL OPERATIONS.

Application of nitric acid—Depletion of the cervix uteri—The cautery—Incision and division of the cervix uteri and internal os—Paracentesis abdominis—Vaginal punction . . 110-124

CHAPTER V.

SOME MINOR GYNÆCOLOGICAL OPERATIONS (*continued*).

Intra-uterine medication—The use of the uterine curette, and dangers of curettage 125-138

CHAPTER VI.

DISORDERS OF MENSTRUATION—INTRODUCTORY—AMENORRHŒA.

PAGES

Ovulation and menstruation—Classification of abnormal menstrual states—Amenorrhœa—Causes and treatment . . . 139-161

CHAPTER VII.

DISORDERS OF MENSTRUATION (*continued*)—DYSMENORRHŒA.

Pain: Congestive, obstructive, spasmodic—Treatment, use of morphia in—Weir Mitchell treatment—Membranous dysmenorrhœa, etc. 162-185

CHAPTER VIII.

DISORDERS OF MENSTRUATION (*continued*)—MENORRHAGIA, METRORRHAGIA, AND LEUCORRHŒA.

Hæmorrhage, its treatment—Leucorrhœa, its treatment . . 186-196

CHAPTER IX.

UTERINE DISPLACEMENTS.

Predisposing causes, and results of anteversion and anteflexion—Treatment—Stenosis of the cervix—Intra-uterine stems . 197-220

CHAPTER X.

UTERINE DISPLACEMENTS (*continued*).

Retroversion and retroflexion—Treatment—Various pessaries—Various operative procedures for raising and fixing the uterus in cases of retroversion and retroflexion . . 221-248

CHAPTER XI.

UTERINE DISPLACEMENTS (*continued*).

Hypertrophic elongation of cervix—Supports—Operations for restoring the perinæum—Operations for vaginal prolapse—Rectocele—Amputation of the cervix, episiorraphy, etc. . 249-284

CHAPTER XII.

UTERINE DISPLACEMENTS (*continued*).

Inversion of the uterus—Classification, causation, and management 285-296

CHAPTER XIII.

UTERINE REFLEXES.

PAGES

Causes and evidences of—Table of abnormal conditions of the sexual organs in women, and the signs and symptoms complained of. 297-306

CHAPTER XIV.

INFLAMMATION OF THE UTERINE TISSUES—ACUTE AND CHRONIC.

Acute metritis and endometritis—Chronic cervical endometritis—Chronic corporeal endometritis—Microscopical diagnosis of growths of the cervix uteri—Subinvolution . . . 307-331

CHAPTER XV.

LACERATION OF THE CERVIX.

Causation—Operative treatment of 332-338

CHAPTER XVI.

EROSION—GRANULAR AND FOLLICULAR DEGENERATION OF THE CERVIX.

Varieties of erosion—Treatment—Follicular degeneration . 339-347

CHAPTER XVII.

PERIMETRIC INFLAMMATION AND PERI-UTERINE PHLEGMON.

Perimetritis — Micro-organisms in pelvic suppuration — Intra-peritoneal collections of pus — Appendicitis — Operative treatment of pelvic suppuration — Peri-uterine phlegmon—Symptoms and treatment—Differentiation . . . 348-371

CHAPTER XVIII.

PELVIC HÆMORRHAGE.

Varieties of—Causes of—Diagnosis of 372-380

CHAPTER XIX.

UTERINE NEOPLASMS—POLYPUS UTERI.

Diagnosis—Operation for 381-389

CHAPTER XX.

UTERINE NEOPLASMS (*continued*)—FIBROID TUMOURS.

PAGES

Etiology, pathology, symptomatology, etc.—Diagnosis—Fibro-cystic tumours—Differentiation—Pregnancy complicating fibroma—Treatment of uterine tumours—Ligation of the uterine arteries 390-415

CHAPTER XXI.

GENERAL OBSERVATIONS ON THE OPERATIVE SURGERY OF THE UTERUS AND ANNEXA.

Antiseptic precautions—Operator—Instruments and appliances—Preparation of the patient 416-424

CHAPTER XXII.

GENERAL OBSERVATIONS ON THE OPERATIVE SURGERY OF THE UTERUS AND ANNEXA (*continued*).

Various forms of sutures and ligatures 425-434

CHAPTER XXIII.

SURGICAL TREATMENT OF UTERINE FIBROMATA.

Classification of the various operative procedures . . . 435-440

CHAPTER XXIV.

SURGICAL TREATMENT OF UTERINE FIBROMATA (*continued*).

Extra-peritoneal abdominal hysterectomy—Description of the operation—Various methods of treating the pedicle—After-treatment and complications—Obstruction by strangulation . 441-463

CHAPTER XXV.

SURGICAL TREATMENT OF UTERINE FIBROMATA (*continued*).

Intra-peritoneal hysterectomy and pan-hysterectomy . . 464-471

CHAPTER XXVI.

SURGICAL TREATMENT OF UTERINE FIBROMATA (*continued*).

Other operative procedures for the removal of uterine fibroids—Enucleation—Morcellement—Myomectomy—The Wölfler-Hacker method—Decortication—Veit's Method—Doyen's

PAGES

method—Snegireff's method—Jessett's method—Salpingo-oöphorectomy for fibroid tumours—Relative mortality and risk of operations — General conclusions — Post-operative hernia 472-498

CHAPTER XXVII.

TUBERCULOSIS OF THE UTERUS.

Symptomatology and pathology 499-503

CHAPTER XXVIII.

MALIGNANT GROWTHS AND DEGENERATIONS — DECIDUOMA MALIGNUM.

Etiology—Symptomatology—Differential diagnosis . . 504-511

CHAPTER XXIX.

MALIGNANT GROWTHS AND DEGENERATIONS (*continued*).

Etiology—Medullary cancer—Carcinoma and epithelioma of the cervix—Symptomatology—Cancer of the body of the uterus—Sarcoma of the body of the uterus—Treatment of cancer of the uterus—Minor operations for—Choice of operation—Vaginal hysterectomy—Various methods of performing—Cœlio-vaginal hysterectomy—Sacral method . . . 512-560

CHAPTER XXX.

AFFECTIONS OF THE FALLOPIAN TUBES.

Classification—Salpingitis—Etiology—Pathology—Hydro-salpinx—Hæmato-salpinx—Pyo-salpinx — Papilloma—Tubercle—Salpingocele 561-585

CHAPTER XXXI.

TUBAL PREGNANCY.

Pathology — Intra-peritoneal and extra-peritoneal rupture—Varieties of gestation 586-596

CHAPTER XXXII.

AFFECTIONS OF THE OVARIES—OVARITIS.

Classification — Displacements — Ovaritis — Chronic ovaritis—Varieties of—Cystic ovaritis—Hæmato-cystic and pyo-cystic . 597-609

CHAPTER XXXIII.

AFFECTIONS OF THE OVARIES (*continued*).

PAGES

Indications for the operation of salpingo-oöphorectomy—The operation of salpingo-oöphorectomy — Alternatives for salpingo-oöphorectomy 610 624

CHAPTER XXXIV.

CORRELATION OF SEXUAL FUNCTION AND INSANITY.

The medico-legal relations of disordered menstruation . . 625-629

CHAPTER XXXV.

CLASSIFICATION AND PATHOLOGY OF TUMOURS, DERMOIDS, AND CYSTS OF THE OVARY, PAROVARIUM, AND GARTNERIAN DUCT 630-642

CHAPTER XXXVI.

OVARIAN CYSTOMA AND OTHER GROWTHS.

Differentiation — Diagnosis — Terminations — Treatment — Fibroma, myoma, and sarcoma, endothelioma, gyroma, papilloma 643-667

CHAPTER XXXVII.

OPERATION OF OVARIOTOMY FOR OVARIAN CYSTOMA.

Intra-peritoneal method and extra-peritoneal method . . 668-683

CHAPTER XXXVIII.

AFFECTIONS OF THE VAGINA.

Vaginismus—Causation, symptoms, and treatment—Vaginitis—Cystic—Granular — Gonorrhœal — Etiology — Pathology—Treatment—Malformations of the vagina and hymen—Atresia—Signs—Symptoms arising from retained menses—Operative interference—Vaginal fistulæ—Varieties of—Various operative procedures—Vaginal bacteriology . . . 684-726

CHAPTER XXXIX.

AFFECTIONS OF THE VULVA.

Classification—Hermaphroditism—Various cutaneous affections—Treatment of—Pruritis—Causation and treatment—Lupus—Rodent ulcer — Papilloma — Syphilis — Vulvitis — Simple,

PAGES

purulent, follicular — Phlegmon — Abscess — Noma, warts, and vegetations — Trachoma — Hæmatoma — Varix — Elephantiasis — Hernia — Hydrocele — Epithelioma — Chancroid . 727-756

CHAPTER XL.

COCCYGODYNIA.

Causation and treatment 757-759

CHAPTER XLI.

URETERAL AFFECTIONS.

Classification — Abnormalities — Urethritis — Prolapse — Urethro-vaginal abscess — Stricture — Fistulæ — Polypi — Caruncle — Physiological rest to the bladder 760-769

CHAPTER XLII.

THE BLADDER.

Examination of — Various methods, including Howard Kelly's — Cystoscopy — Cystitis — Stone — Tumours and growths . 770-786

CHAPTER XLIII.

THE URETERS.

Classification of affections of — Ureteritis — Howard Kelly's Method of Exploration — Calculus — Stricture — Fistula — Operations for — Uretero-ureterostomy 787-801

CHAPTER XLIV.

THE KIDNEY.

Renal enlargement — Landmarks — Examination by palpation and aspiration — Various affections causing enlargement of — Differentiation of hydro-nephrosis and tumours — Movable kidney — Nephrorraphy 802-816

CHAPTER XLV.

SOME AFFECTIONS OF THE RECTUM.

Classification of — Examination of — Proctitis — Fæcal tumours — Fistulæ — Hæmorrhoids, external and internal — Operative treatment — Ulceration and Stricture — Cancer — Pruritus ani — Procidentia — General therapeutic hints 817-839

CHAPTER XLVI.

STERILITY.

PAGES

Causes of sterility—Not due to defect of the female generative organs 840-845

CHAPTER XLVII.

GYNÆCOLOGICAL ELECTRO-THERAPEUTICS.

Results of treatment by—Details of methods and appliances—Galvano-caustic and faradic methods—Indications for—Full instructions for application of the galvano-caustic treatment . 846-865

CHAPTER XLVIII.

MASSAGE.

Varieties of—Physiological effects of—Use in gynæcology—Combined internal and external—Dangers of—Weir Mitchell on—Conclusions regarding 866-879

CHAPTER XLIX.

A FEW OF THE PRINCIPAL FOREIGN AND HOME SPAS.

Some health resorts specially useful in female affections . . 880-883

APPENDIX.

Le Bec's operation of pan-hysterectomy for fibromata . . 884

LEEDS & WEST RIDING
MEDICO-CHIRURGICAL SOCIETY

LIST OF ILLUSTRATIONS.

FIG.		PAGE
1.	The Vulva	2
2.	Kelly's Urethral Calibrator	5
3.	Section showing Pelvic Viscera and Perinæum	7
4.	From Braune, showing Distended Rectum and Empty Bladder	8
5.	From Braune, showing Distended Bladder (Piragoff's section)	8
6.	Knee-elbow Position	12
7.	Vertical Section of Uterus (Ramsbotham)	13
8.	Lateral Section of Uterus (Ramsbotham)	15
9.	From Braune, showing Uterus pressed upon by Distended Bladder and Rectum	15
10.	Normal Position of Virgin Uterus (Schultze)	16
11.	Relative Position of Pelvic Viscera (A. Farre)	17
12.	Uterus and Appendages: diagrammatic view (Quain's Anatomy)	19
13.	Diagram of Uterus to show Division of Cervix (Schroeder)	20
14.	Conical Cervix	21
15.	Os Uteri of Pregnancy (after Ramsbotham)	21
16.	Congenital Stenosis	22
17.	Diagram of the Vascular Supply of the Vagina (from Hyrt)	24
18.	Ovary with Fallopian Tube in Position—natural size (Bland Sutton)	25
19.	Ovary of Woman Forty Years of Age—natural size (Bland Sutton)	25
20.	Vertical Section through Broad Ligament (Anderson)	26
21.	Section of Pelvis showing Ligaments of Uterus (Anderson)	26
22.	Uterus during Menstruation	29
23.	Showing Relation of Uterus to Uterine Arteries, Ureters, and Bladder (Greig Smith)	32
24.	Pelvic Portion of Ureter from Below	34
25.	Diagrammatic Figure to show Portion of Ureter accessible to the Examining Finger	35
26.	Showing Disturbed Relation of Parts when the Uterus is drawn down (Greig Smith—after Savage)	36
27.	Czempin's Operating Table	45
28.	Patient under Anæsthetic in Dorso-sacral Position (after Pozzi)	45
29.	Ordinary Study Couch	46
30.	Patient in Dorsal Position for Examination on Convenient Study Chair	46

FIG.		PAGE
31.	Trendelenburg's Position	47
32.	Operating Table of Delajenière (Dupont)	47
33.	Genu-pectoral Position on Couch	48
34.	Crutch and Leg Rest, with Couch of Alexander	48
35.	Jessett's Portable Operating Table	49
36.	Portable and Folding Table of Doléris (Pozzi)	49
37.	Tapering Speculum of Author	53
38.	Bivalve Speculum of Robert Barnes	54
39.	Sims' Duck-bill Speculum	54
40.	Neugebaur's Speculum	55
41.	Fergusson's Speculum	55
42.	Coxeter's Electric-light Speculum	55
43.	Bath Speculum	56
44.	Brewer's Bivalve and Duck-bill Speculum combined	56
45.	Hawkins Ambler's Uterine Dressing Probe	57
46.	Metal Sponge-holder	57
47.	Sims' Tenaculum	58
48.	Rectangular Speculum Forceps	58
49.	Arnold's Speculum Forceps	58
50.	Simpson's Sound	58
51.	Sims' Pliable Probe	58
52.	Duncan's Sound	58
53.	Small Portable Sound of Author	58
54.	Demonstration Speculum of Author	59
55.	Appliance folded (¼ size)	59
56.	Olivier's Irrigating Sound	59
57.	First Stage of passing Sound (Hart and Barbour)	60
58.	Second Stage of passing Sound (Hart and Barbour)	61
59.	Sound in Utero	62
60.	Rotation of Sound	63
61.	Sound arrested before Rotation (Hart and Barbour)	65
62.	Clover's Gas or Ether Inhaler	70
63.	Junker's Inhaler	70
64.	Bartlett's Aspirator	72
65.	Aspirator (Matthews Brothers)	72
66.	Aspirating Needle	72
67.	Tupelo Tent	74
68.	Sponge Tent	74
69.	Laminaria Tent	74
70.	Tent Forceps	75
71.	Tent Introducer	75
72.	Tampon Introducer (Robert Barnes)	75
73.	Ovum Forceps (Heywood Smith)	75
74.	Author's Uterine Bougies	77
75.	Hégar's Dilator	77
76.	Wathan's Uterine Dilator	78
77.	Reverdin's Dilator	78
78.	Duke's Dilator	78

FIG.		PAGE
79.	More Madden's Dilator	78
80.	Lawson Tait's Dilators	79
81.	Revolving Uterine Scissors (Heywood Smith)	80
82.	Abdomino-vaginal Examination (Schroeder)	86
83.	Recto-vesical Examination	88
84.	Genital Organs from Female Child (George Carpenter)	92
85.	Pelvic Organs of Female Child (George Carpenter)	93
86.	Lane's Rectal Speculum	107
87.	Davy's Rectal Speculum	107
88.	Gowland's Rectal Speculum	107
89.	Bozeman's Uterine Catheter	107
90.	'Alpha' Vaginal Syringe	108
91.	Soft Rubber Vaginal Pipe	108
92.	Combination Syringe and Dilator (Barnes and Higginson)	108
93.	Rectal Syringe	108
94.	Author's Speculum Slice	109
95.	Buden's Uterine Grooved Catheter	109
96.	Bozeman's and Simon's Retractors	109
97.	Holder covered with Wool—exact size	111
98.	Aluminium Wool-holder	111
99.	Roughened End of Wool-holder	111
100.	Atthill's Trocar and Cannula	111
101.	Hall's Lancet	112
102.	Pacquelin's Thermo-cautery	113
103.	Sattler-Nieden Universal Cautery Handle	114
104.	Cylindrical Cautery Handle	114
105.	Electric Transformer	114
106.	Porcelain Cautery	114
107.	Cautery Battery (Accumulator)	115
108.	Kuchenmeister's Scissors	116
109.	Marion Sims' Knife for Division of Cervix	117
110.	Blades—natural size	117
111.	Author's Celluloid-wire Stem	117
112.	Intra-uterine Stem of Duke	118
113.	Wells' Trocar	119
114.	Guarded Trocar of Sir Spencer Wells	119
115.	Bengué's Bottle of Chlorethyl	120
116.	Bistoury	123
117.	Jessett's Waterproof Funnel	123
118.	Smester's Funnel for Vaginal Injections (Pozzi)	124
119.	Syphon Rectal Feeding Tube	124
120.	Intra-uterine Injector	130
121.	Ointment Positor (Robert Barnes)	130
122.	Intra-uterine Injector	130
123.	Porte-caustique	130
124.	Author's Intra-uterine Medicator	130
125.	Small Platinum Crucible	131

FIG. PAGE
126. Various Uterine Curettes 134
127. Flushing Curette of Duke 134
128. Curettes for Use in Cancer of Uterus 134
129. Curette Forceps of Noble 134
130. Galvanic Stem of Barnes 159
131. Rigid Galvanic Stem 159
132. Simpson's Galvanic Stem 159
133. Peaslee's Galvanic Stem 159
134. Leclanché's Constant Current Battery 175
135. Portable Voltaic Battery 176
136. Temperature and Water Gauge Douche 185
137. Can Douche and Tube of Author 187
138. Degrees of Anteversion 199
139. Galabin's Pessary 205
140. Blackbee's Pessary 205
141. Hewitt's Cradle applied 207
142. Hewitt's Pessary 207
143. Gehrung's Pessary 207
144. Fowler's Pessary 208
145. Anteflexion of Uterus (Schroeder) 209
146. Sims' Operation for New Uterine Axis 213
147. Bilateral Division of the Cervix with Kuchenmeister's Scissors . 213
148. Dudley's Operation: Application of Sutures (Keith) . . . 216
149. Gordon Black's Stem 217
150. Bantock's Stem 217
151. Wynn Williams' Stem 217
152. Stem detached 217
153. Chambers' Stem 217
154. Hewitt's Stem 217
155. Uterine Support of Author 219
156. Degrees of Retroversion (Schroeder) 222
157. Retroflexion (from Schroeder) 222
158. Sims' Repositor 225
159. Author's Extra-uterine Elevator and Repositor . . . 225
160. Introduction of Sound before Rotation 225
161. Rotation of Sound in Retroversion (Hart and Barbour) . . 226
162. Thomas' Modified Smith-Hodge 229
163. Arnold's Glycerine Pad 229
164. First Step of Introduction (Pessary) 230
165. Second Step of Introduction 230
166. Smith-Hodge Pessary in Position (after Goodell) . . . 230
167. Celluloid Ring 231
168. Celluloid Ring finally moulded 231
169. First Shape 231
170. Second Shape 231
171. Third Shape 231
172. Watch-spring Pessary 232
173. Metal Smith-Hodge 232

FIG. PAGE
174. Glycerine Ring 235
175. Routh's Pessary 236
176. Passage of Suspensory Suture in Hysterorraphy (Kelly) . . 241
177. Suturing Round Ligaments to Abdominal Wall in Hysterorraphy (Kelly) 241
178. Elevator to hold up Uterus 242
179, 180. Operation of Olshausen and Sänger (Bonnet and Petit) . 243
181. Terrier's Operation: sectional view (Bonnet and Petit) . . 243
182. Terrier's Operation, showing Silk Thread inserted into the Fundus (Bonnet and Petit) 244
183, 184. Useful Needle-holders 245
185. Charles Noble's Needle-holder 245
186. Prolapse complicated with Cystocele (Macnaughton-Jones) . 250
187. Showing Gradual Descent of Uterus (Thomas) . . . 250
188. Prolapsus with Cystocele (after Schroeder) 251
189. Hypertrophic Elongation of Cervix (Schroeder) . . . 251
190. Ruptured Perinæum, Rectocele, and Cystocele, with Elongation of Cervix, simulating Prolapsus (after Martin) . . . 255
191. Duke's Abdominal Belt 256
192. Vulcanite Zwanck 257
193. Godson's Modification of Zwanck 258
194. Napier's Prolapse Pessary 259
195. Braun's Colpeurynter 259
196. Inflating Pessary 260
197. Palfrey's Perinæal Pad 260
198. Light Pelvic Strap for Perinæal Pad 261
199. Howard Kelly's Leg-support 262
200. Dowd's Jacket and Leg-rest 263
201. Absent Perinæum with Retroversion (after Martin) . . . 264
202. Ruptured Perinæum and Cystocele (after Martin) . . . 264
203. Scissors of Sims, curved on the Flat 265
204, 205. Sims' and Skene-Goodman's Self-retaining Catheters . . 265
206. Denuded Surface, Anus involved (Goodell) 266
207. Denuded Surface, Anus not involved (Goodell) . . . 266
208. Perinæal Needles 268
209. Needle-carrier 268
210. Needle-holder of Sims 268
211. Splitting the Recto-vaginal Septum (Vulliet) . . . 269
212. Passage of the Suture (Vulliet) 269
213. Wound closed (Vulliet) 270
214. Rectal and Vulval Incisions 271
215. Application of Sutures 271
216. Doléris' Modification of Tait's Operation (Bonnet and Petit) . 272
217. 'Colpoperinéoplastie par Glissement' (Bonnet and Petit) . . 273
218. Sims' Operation 277
219. Anterior Colporraphy (Doléris) 278
220. Anterior Colporraphy, showing Final Suture (Doléris) . . 278
221. Reamy's Operation for Rectocele 279

b

FIG.		PAGE
222.	Colpoperinæorraphy (Martin's Method)	279
223.	Amputation of Cervix (Sims)	281
224.	Amputation of Vaginal Cervix by Schroeder (Bonnet and Petit)	282
225.	Sectional View of Same	282
226.	Inversion of the Uterus (Robert Barnes)	286
227.	Partial Inversion of Uterus, 2nd degree (Bonnet and Petit)	287
228.	Conjoined Examination, Inverted Uterus	287
229.	Prolapsus Uteri (Schroeder)	287
230.	Outline Diagram of Complete Inversion (adapted from Thomas)	289
231.	Outline Diagram of Partial Inversion (adapted from Thomas)	289
232.	Outline Diagram of Polypus at Summit of Uterine Cavity (adapted from Thomas)	289
233.	Reduction of Inverted Uterus (Emmet)	291
234.	White's Cup Repositor (Thomas)	292
235.	Sigmoid Repositor	294
236.	Périer's Appliance for Amputation by Elastic Traction (Bonnet and Petit)	295
237.	Leiter's Temperature Coil	312
238.	Vertical Section of Uterus Three Months after Curettage (Baldy)	314
239.	Dressing the Cervix with Sims' Speculum and Uterine Probe	322
240.	Epithelial Denudation around the Os Uteri (Robert Barnes)	329
241.	Stellate Laceration (Emmet)	332
242.	Bilateral Laceration, 1st degree (Bonnet and Petit)	335
243.	Bilateral Laceration, 2nd degree (Bonnet and Petit)	335
244.	Sims' Elbow Scissors	337
245.	Emmet's Needle and Holder	337
246.	Emmet's Operation—Denuded Surface and Sutures	337
247.	Sutures passed	338
248.	Sutures applied	338
249.	Author's Vaginal and Uterine Speculum and Operating Insufflator	344
250.	Duke's Insufflator	344
251.	Follicular Hypertrophy (Pozzi)	345
252.	Sims' Curette	346
253.	Follicular Hypertrophy of the Cervix (Pozzi)	346
254.	Mucous Polypi growing from the Interior of Cervix (Pozzi)	346
255.	Collection of Serum in Peritoneal Cavity—Perimetritis Serosa (Schroeder)	350
256.	Pelvic Abscess (Wallace)	353
257.	Pelvic Abscess (Wallace)	354
258.	Showing Relation of Adhesion	357
259.	Showing Adhesion of Old Pedicle	358
260.	Sutures	359
261.	Retro hæmatocele (Schroeder)	372
262.	Hæmatocele in the Peritoneum (after Emmet)	375
263.	Retro-uterine Hæmatocele from Diseased Ovary (Robert Barnes)	376
264.	Exploring Trocar and Cannula	378
265.	Submucous Fibroid	381
266.	Outline Diagram of Polypus of Cervix (adapted from Thomas)	381

FIG. PAGE
267. Outline Diagram of Polypus 381
268. Fibroid Tumour of Uterus (Robert Barnes) 382
269. Fibroid Polypus extruded from Uterine Cavity (Robert Barnes) . 385
270. Removal of Polypus by Écraseur and Vulsellum (Atthill) . . 386
271. Routh's Wire Conductor 388
272. Author's Polyptome 389
273. Myoma of Pregnant Uterus (Alban Doran) 393
274. Fibro-myoma of Uterus 393
275, 276. Section of Tumour 394
277, 278. Interstitial and Subperitoneal Fibroids (Schroeder and Emmet). 397
279. Interstitial Fibromata (Pozzi) 397
280. Subperitoneal Pediculated Fibroid (Robert Barnes) . . . 398
281. Pediculated Subperitoneal Fibroid, with Multiple Nuclei (Macnaughton-Jones) 398
282. Fibro-myoma from Ligament of Ovary (after Doléris) . . 400
283. Pediculated Fibroma of Uterus (after Schroeder) . . . 400
284. Interstitial Fibromata 408
285. Myomatous Pregnant Uterus and Fœtus (G. Elder) . . . 409
286. Shows Incision over Left Broad Ligament (Martin) . . . 412
287. Separation of Broad Ligament 413
288. Grasping the Base of Broad Ligament 413
289. Ligaturing Base of Broad Ligament 414
290. Greig Smith's Operating Table 423
291. Dissecting Scissors 424
292. Rampley's Sponge-holding Forceps 424
293, 294. Sterilizer 425
295, 296. Antiseptic Reel-holders 426
297. Macfarlane's Reel-holder 426
298. Czerny's Suture 427
299. Lembert's Suture 427
300. Gussenbaur's Suture 427
301. Position of Three Threads in the Suture (Pozzi) . . . 428
302. Simple Continuous Suture commenced (Pozzi) . . . 428
303. Continuous Suture nearly finished 428
304. *Suture à Étages* (Pozzi) 429
305, 306. Suture of Abdominal Walls after Hysterectomy (Pozzi) . . 430
307. Surgeon's Knot 430
308, 309. Ordinary Loop-knot for Pedicle (Doran) . . . 430
310. Bantock's Knot (Doran) 431
311. Tait's Staffordshire Knot 431
312. Chain Ligature on Pedicle (Doran) 431
313. Chain Ligature (Pozzi) 431
314, 315. Consecutive Loops of Chain Ligature (Pozzi) . . . 431
316. Loops of Chain Ligature (Pozzi) 432
317. Showing Threads of Ligature 432
318. Forceps of Hégar (Pozzi) 432
319. Suture of Abdominal Walls in Hysterectomy (Pozzi) . . . 433
320. Greig Smith's Suture-holder and Needle 433

FIG.		PAGE
321.	Reverdin's Needle	434
322.	Kaltenbach's Hollow Needle	434
323.	Deschamp's Needles	434
324.	Author's Glass Retractors	443
325.	Maunsell's Self-holding Retractors	444
326.	Hysterectomy Forceps (Reeves)	446
327.	Broad Ligament Forceps	446
328.	Greig Smith's Pressure Forceps	446
329.	Tait's Screw for Withdrawal of Tumour	447
330.	Ligation and Division of Broad Ligaments in Hysterectomy	448
331.	Maunsell's Guard	449
332.	Kœberlé's Serre-nœud	450
333.	Tait's Temporary Rope Tourniquet	450
334.	The Tourniquet of Pozzi	451
335.	Elastic Ligature held by Pozzi's Tourniquet	451
336.	Taylor's Method of Clamping the Pedicle (Taylor)	452
337, 338.	Suture of Abdominal Walls after Hysterectomy (Pozzi)	453
339.	Suture of Abdominal Walls in Hysterectomy (Pozzi)	454
340.	Elastic Ligature applied to Pedicle (Greig Smith)	455
341.	Pedicle Pin	456
342.	Tait's Pedicle Pins	456
343.	Tait's Serre-nœud	456
344, 345.	Doléris' Treatment of the Pedicle (Bonnet and Petit)	457
346.	Greig Smith's Peritoneum Forceps	462
347.	Intra-peritoneal Method (Schroeder)	465
348.	Passage of Double Ligature	467
349.	Successive Ligatures of Hood Ligament	468
350.	Ligatures cut short and Pedicle dropped	469
351.	Roll of Iodoform Gauze	470
352.	Forceps for grasping Tumour in Morcellement	475
353.	Péan's Cyst Forceps	475
354.	Toothed and Serrated Forceps	475
355.	Mixed Method of Wölfler and Hacker	478
356.	Abdominal Hysterectomy (Doyen)	480
357.	Enveloping Peritoneum after Removal of Tumour	481
358.	Closure of Pelvic Peritoneum	482
359.	Jessett's Broad Ligament Forceps	485
360.	Bivalve Vaginal Obturator (Jessett)	485
361.	Jessett's Snap-catch	485
362.	Bivalve Obturator pushed into Vagina	486
363.	Snap-catch passed through Obturator	486
364.	Tuberculosis of Cervix	500
365.	Tubercular Disease of Uterus (Robert Barnes)	501
366.	Experimental Tuberculosis (Cornil)	502
367.	Giant Cells (Maurice Cazin)	505
368.	Giant Cells	507
369.	Thrombosis of Lymph Vessel of Left Ovary with Cancer Epithelia	515
370.	Scirrhous and Adenoid Portion of Growth	516

FIG. PAGE
371. Adenoid and Medullary Portion of Growth 516
372. Small Cellular or Inflammatory Infiltration of Fibrous Connective-tissue near Cancer 516
373. Cauliflower Excrescence growing from Cervix (Sir J. Simpson) . 519
374. Cancerous Growth in Posterior Wall of Cervix (J. Williams) . 519
375. Collection of Round and Irregular Large and Small Cells . . 521
376, 377. Sections of Growth 522
378. Surface of Cervix, showing Epithelial Ingrowths . . . 525
379. True 'Nest' (same specimen) 525
380. Fasciculated Connective-tissue (same specimen) . . . 525
381. Cancer of Lower Half of Uterus (Robert Barnes) . . . 527
382. Carcinoma of Body of Uterus (after Sir J. Simpson) . . . 533
382*a*. Cancer of Body assuming Polypoid Appearance (Rüge and Veit) . 533
383. Uterus removed for Adeno-sarcoma (Jessett) 535
384. Volkman's Spoon 543
385. Simon's Scoop 543
386, 387. Écraseurs 543
388. Infra- and Supra-vaginal Amputation (Sir Spencer Wells) . . 544
389. Cautery Scissors 550
390, 391. Schroeder's Operation (Martin) 551
392. Opening of Recto-uterine Cul-de-sac (Doyen) . . . 553
393. Application of First Forceps to Broad Ligament (Doyen) . . 554
394. Prolongation of Longitudinal Section to the Fundus (Doyen) . 555
395, 396. Jessett's Hysterectomy Needles 557
397. Jessett's Broad Ligament Forceps 557
398. Chronic Hypertrophic Salpingitis 562
399. Normal Fallopian Tube in Section 562
400. Complete Obstruction of Ostium (Alban Doran) . . . 568
401. Ovary and Tube, showing Obstruction of Ostium (Alban Doran) . 569
402. Ostium of Normal Fallopian Tube 570
403. End of Normal Fallopian Tube with Ostium open . . . 574
404. Ovaries; Meso-metria and Fallopian Tubes viewed from behind . 575
405. Hydro-salpinx with Cystic Ovary attached (Macnaughton-Jones) . 578
406. Infarcted Hydatid with Constricted Pedicle 579
407. Papilloma of Ovary (Alban Doran) 581
408. Tubercle of the Fallopian Tube (Cullingworth) . . . 582
409. Tubercular Salpingitis (Cullingworth) 583
410. Salpingocele (Bland Sutton) 585
411. Tubal Mole (after Walter) 587
412. Tubal Mole (Bland Sutton) 588
413. Chorionic Villi from Tubal Mole (Bland Sutton) . . . 588
414. Uterine Decidua (Bland Sutton) 592
415. Chronic Cortical Ovaritis 601
416. Section of Normal Ovary (Macalister) 602
417. Apoplexy of the Ovary (Doran) 604
418. Leiter's Irrigator 609
418*a*. Leiter's Irrigator applied 609
419. Incisions for Perineotomy 620

FIG. PAGE
420. Diagram representing Cyst Regions of the Human Ovary . . 631
421. Incipient Oöphoronic Cyst (Bland Sutton) 632
422. Portion of a Multilocular Ovarian Cyst (Bland Sutton) . . 633
423. Magnified Section of an Ovarian Cyst (Bland Sutton) . . 634
424. An Ovarian Dermoid (Bland Sutton) 635
425. A Cyst of the Parovarium (Bland Sutton) 637
426. An Ovarian Hydrocele (Bland Sutton) 639
427. A Multilocular Ovarian Cyst (Bland Sutton) 640
428. Ovarian Tumour compressing Thorax (Sir Spencer Wells) . . 645
429. Ovarian Cystoma (Bright) 646
430. Large Polycystic Ovarian Tumour (Howard Kelly) . . . 647
431. A Paunched Abdomen (Howard Kelly) 647
432. Vertical Outlines of a Myomatous Uterus (Howard Kelly) . . 647
433. Nodular Outlines of a Large Fibrocystic Tumour (Howard Kelly) . 647
434. Solid Multilocular Ovarian Cystoma (Macnaughton-Jones) . . 649
435. Dull Areas in Ovarian Tumour and Ascites (Barnes) . . 652
436. Fibroma of the Ovary (Doran) 660
437, 438. Microscopical Sections of Fibromatous Tumour of the Ovary (Author) 662
439. Fibroma of both Ovaries (Cullingworth) 663
440. Sarcoma of the Ovary (Doran) 664
441. Papilloma of the Ovary (Cullen) 666
442. Pint Irrigation Mug 669
443. Wells' Torsion Forceps 670
444. Examining Cyst-wall for Adhesions (Sir Spencer Wells) . . 670
445. Modification of Wells' Trocar 671
446. Nélaton's Forceps for seizing Wall of Cyst 671
447. Insertion of Trocar into Cyst (Sir Spencer Wells) . . . 672
448. Drawing the Cyst out of Incision (Sir Spencer Wells) . . 672
449. Forceps for securing Short Pedicle before Ligature . . . 673
450. Bent or Flat Scissors 673
451. Cyst Forceps 673
452. Kœberlé's Pressure Forceps 673
453. Grasping Solid Trabecular Tumour (Sir Spencer Wells) . . 674
454. Keith's Drainage-tube 675
455. Tait's 'Test-tube' Drainage-tube 675
456, 457. Tait's Aspirating Sucker and Ovariotomy Syphon Trocars . 676
458. Wells' Needle-holder 677
459. Pedicle-Clamp and Forceps (Wells) 681
460. Wells' Pedicle Clamp 681
461. Cautery Clamp 681
462. Sims' Vaginal Rest 688
463. Solid Glass Dilator (Author's) 688
464. Uterus Didelphys 701
465. Didelphian Uterus-Vagina 702
466. Hæmato-colpos, from Atresia of the Vagina 703
467, 468. Diagrammatic Representations of Fistulæ . . . 712
469. Incarceration of Cervix Uteri in Rectum (Bozeman) . . . 714

FIG.		PAGE
470.	Incarceration of Cervix Uteri in Bladder (Bozeman)	714
471.	Genital Fistulæ	714
472.	Tubular Curved Needle	716
473.	Rectangular Needle	716
474.	Emmet's Lance-headed Needles	717
475.	Vesico-Vaginal Fistula Knife	717
476.	Wire Guide	717
477.	Vesico-Vaginal Fistula Knife	717
478.	Vesico-Vaginal Fistula Forceps	717
479.	Emmet's Angular and Curved Scissors	717
480.	Showing Use of Blunt Hook in passing the Suture (Emmet)	719
481.	Wire-twister (Emmet)	719
482.	Wire-catch	720
483.	Wire-twister	720
484.	Bozeman's Adjusters	720
485.	Shape of Button-adjuster (Bozeman)	721
486.	Showing Button Suture closing Fistula (Bozeman)	721
487.	Dilator in Position	724
488.	Sponge Dilators (Bozeman)	724
489.	Utero-Vesico-Urethral Drainage Support	724
490.	Utero-Vesical Drainage Support	724
491.	Pseudo-hermaphroditism	730
492.	Pseudo-hermaphroditism	731
493.	Abscess of the Bartholinian Gland (Huguier)	749
494.	Vegetation of the Vulva (Tarnier)	750
495.	Elephantiasis of the Vulva (Pozzi)	754
496.	Urethral Caruncle	767
497.	Reeves' Urethral Speculum	769
498.	Button-hole Scissors	769
499.	Emmett's Button-hole Opening	769
500.	The Electric Cystoscope	771
501.	Position of the Body for Exploration of the Bladder and Ureter in Howard Kelly's Method	772
502.	Kelly's Urethral Calibrator	774
503.	Speculum and Obturator	774
504.	No. 6 Speculum	775
505.	Howard Kelly's Sucker	775
506.	Hairpin Calculus (Kelly)	782
507.	Croom's Procedure	784
508.	Ureteral Catheter (Howard Kelly)	789
509.	Ureteral Catheters without Handles (Howard Kelly)	789
510.	Toothed Forceps (Howard Kelly)	789
511.	Ureteral Searcher (Howard Kelly)	789
512.	Showing the Use of Ureteral Searcher before Catheterization (Howard Kelly)	792
513.	Stricture of Right Ureter (Howard Kelly)	795
514.	The Field of Operation through the Superior Strait	796

FIG. PAGE
515. The Ureter held by Forceps; the Appearance of the Ureter entering the Opening in the Bladder; the Snug Union of Ureter to Bladder 797
516. Hard-rubber Bougies introduced into both Ureters . . . 799
517. Uretero-Ureteral Anastomosis (Bloodgood) 801
517*a*. Irrigation of the Ureter 801
518. Phosphatic Calculus removed from Right Kidney (Spanton) . 815
519. Author's Belt for Movable Kidney 816
520. Double Air-pad Belt for Movable Kidney 816
521. Four-bladed Rectal Speculum 819
522. Ryall's Dilating Speculum 819
523. Rectal Probe and Protector 822
524. Ligature Tractor 823
525. Straight (Spring) Pile Scissors 827
526. Pile Fork 829
527. Pile Scissors bent on the Flat 829
528. Catch Pile Forceps 829
529. Pile Forceps 829
530. Clamp for crushing Hæmorrhoids 831
531. Ointment Positor 838
532. Rectal Positor 838
533. Faradic Current Battery 851
534. Bipolar Intra-uterine Exciter 852
535. Concentric Bipolar 852
536. Bipolar Vaginal 852
537. Bipolar Vaginismus 852
538. Apostoli's Sulphate of Mercury Battery 853
539. Galvanometer graduated to 250 Milliampères . . . 854
540. Water Rheostat 854
541. Electrode for Galvano-chemical Cauterization . . . 855
542. Gas-carbon Electrode 855
543. Rigid Platinum Sound 856
544. Platinum-ended Sounds with Flexible Stems 856
545. Showing the Electrode in the Uterine Cavity (Bigelow) . . 858

PLATES.

1. Central Choroido-retinitis.
2. Choked Optic Papilla.
3. Additional Hysterectomy Appliances, Fig. 560.
4. ,, ,, ,, Fig. 561.
5. ,, ,, ,, Fig. 562.
6. ,, ,, ,, Fig. 563.

LEEDS & NORTH
MEDICO CHIRURGICAL SOCIETY

DISEASES OF WOMEN.

CHAPTER I.

ANATOMICAL AND CLINICAL.

INTRODUCTORY.—ANATOMICAL FACTS BEARING ON GYNÆCOLOGICAL PRACTICE.

It is outside the scope of this work to enter into a detailed description of the female pelvic organs and their relations. A few anatomical lessons have, however, to be remembered by every student and practitioner, which have an important clinical bearing when examining or conducting a gynæcological case. It is necessary in the first place very briefly to allude to these.

Vulva (Fig. 1).—The vulvar orifice is elliptical in shape, and comprises the mons veneris, labia majora, labia minora, clitoris, meatus urinarius, vestibule, fossa navicularis, fourchette and hymen. It varies in size in different individuals. In some women the vulvar opening is contracted. Both its size and elliptical shape influence us in the choice and method of introduction of a speculum, in the virgin, and in sensitive women. The best tubular specula are those of a tapering form, or such as expand with two or three blades. Occasionally there is complete atresia of the vaginal orifice. Here it will be necessary to interfere surgically. The sebaceous follicles on the inner surfaces of the labia, with the adjacent mucous membrane, offer to all contagious secretions a large surface for the retention of fluids, septic particles, or any specific virus. On

the vulva or vulvar orifice we occasionally find, in unhealthy states of the system, aphthous or gangrenous sores, specific ulcers, purulent discharges; in children, noma vulvæ. Its exposed position renders it specially liable to injury, either

FIG. 1.—The Vulva. *a*, Labia majora; *b*, Labia minora; *c*, Meatus uninarius; *d*, Glans clitoris; *e*, Clitoris; *f*, Mons veneris. (Sharpey.)

from accident or violent intercourse. The apposition of its mucous surfaces, and the irritation produced by friction during exercise, or in inflammatory states of the vagina, when we have unhealthy discharges, cause a sense of heat, and other symptoms

of vulvitis. During the exanthemata, in puerperal and other fevers, as small-pox, measles, scarlatina, the vulva is occasionally inflamed. The predisposition of the follicles and mucous membrane to inflammation, their occasional exposure to irritating secretions, the effects of uncleanliness and injuries, and the abundance of cellular tissue found under the mucous membrane, afford a ready explanation of the frequency with which phlegmonous inflammation attacks the vulva. Beneath the labia is the vascular bulbous hirudiniform body, the bulb of Kobelt, which is composed of a large plexus of veins. In this anatomical arrangement we have an explanation of pudendal hæmorrhage and thrombus. I have seen fatal hæmorrhage follow from malignant ulceration of one labium, notwithstanding that every means of treatment was employed. The large vascular supply of the vulva accounts, also, for the occurrence of septic poisoning and septicæmia, which result from injuries and abscess of the vulva, or from the breaking down of a thrombus and the exposure of coagula. It is evident that cleanliness is the first essential of treatment in any case of vulvar inflammation. Careful antisepsis is indicated when any incisions are made in vulvitis. The vulvo-vaginal gland occasionally has its duct occluded, and over-distension of the duct may follow, with arrest of secretion and inflammation of the lining membrane spreading to the gland, abscess in the gland, or hyper-distension of the gland and the formation of a cyst. The presence of a defined tumour at either side of the vulva, varying in size from a large nut to a pigeon's egg, painful and fluctuating, is fairly characteristic. The analogy of the labia to the male scrotum is obvious. As the loop of intestine descends with the spermatic cord in the male into the scrotum, so it passes with the round ligament to the labium in the female. Care must be taken not to mistake a painful hernia of the labium for an abscess. Unless there be strangulation, the hernia returns with the horizontal posture and pressure. The obliteration of the canal of Nuck explains the comparative rarity of inguinal hernia in the female. Yet a hydrocele of the

round ligament may occur. It is necessary to bear this contingency in mind.

Such a case I had under my care; the lady came for 'removal of the tumour.' I expressed the opinion that it was a hernia. Another surgeon subsequently pronounced it to be an encysted hydrocele of the left round ligament. I was, in the course of time, suddenly called to see this patient. The bowel had ruptured. I made an artificial opening, and she recovered. Another swelling afterwards came in the right side. This proved to be a piece of strangulated gut. She was again operated upon, and was getting on well, when a gross imprudence in diet induced peritonitis, of which she died.

The Clitoris.—This may be hypertrophied and abnormal in size. We should remember its position at the commencement of the vestibule, half an inch behind the anterior angle formed by the labia. It may be avoided in digital examinations, by keeping to the rectal wall of the vagina, and when passing the catheter, by arriving at the meatus through the guide afforded in the cord-like feel of the urethra. If beginners have a difficulty in hitting off the orifice of the urethra, or there be any delay in finding it, it is far less distressing to the patient, and saves useless bungling, to separate the thighs, and by gently drawing the labia apart, to see the urethral opening. Masturbation leads to many forms of nervous mischief in women. The operation of clitoridectomy for various disorders of the nervous system, more especially epilepsy and hystero-epilepsy, brought on by masturbation, is not an accepted operation in this country. Rather must we combat it by judicious moral means, healthier mental and physical occupations and enjoyments. Even if we do not lead the patient to believe that we suspect the habit, we must, by the directions we give in her hearing, or to her, let her feel that such a practice, or any that leads to undue excitement, is bad for her. Next to masturbation, too frequent medical examinations—as often demanded by the woman as they are unnecessary for any therapeutical or diagnostic purpose on the physician's part—are to be condemned.

The Urethra.—The shortness of the female urethra saves the woman the penalty paid for every additional inch in length

...LOS... ...OLD CHIRURGICAL SOCIETY

of the male canal. Its dilatability admits of digital exploration of the bladder, after suffieient dilatation with an ordinary urethral dilator, a small glove-stretcher, or any uterine dilator. In dilating the urethra, as pointed out by Simon, a dilatation of 2 centimetres is suffieient to enable us to introduce the index-finger into the bladder. I always prepare the way for the finger by the previous passage of my graduated dilators.

Howard Kelly uses a urethral ealibrator for exploring the bladder in his new method of endoscopy and for catheterization of the ureters. He says: 'In order to determine the proper dilator to begin with, I calibrate the meatus urinarius externus by means of a slender metal cone 10 centimetres long, marked in a graduated scale from the point (2 mm.) to its other end (20 mm.) in diameter.

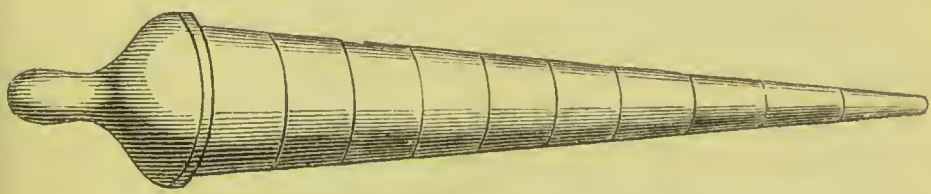


FIG. 2. – Kelly's Urethral Calibrator (the lines indicate the diameter in millimetres).

The ealibrator is pushed into the urethra as far as it will readily go, and the marking of the meatus is noted.' This indieates the calibre of the dilator to be first introdueed. 'The average female urethra,' he says, 'ean be easily dilated up to 12 mm. in diameter, with only a slight external rupture. I have never seen a tear more than 2 or 3 mm. in length, and from 1 to 1½ mm. in depth.' In introducing the finger, it must be borne in mind that the safety with whieh it is used depends upon the size of the digit of the operator, and also on the eare and gentleness with which it is inserted. The author has never had any permanent bad results from such combined instrumental and digital exploration of the bladder. The *circumference* of the terminal joint of his forefinger is 5

centimetres, that of the first 7 centimetres. It is unnecessary to put a patient to the slow torture of sea-tangle or tupelo dilatation. Dilatation renders litholapaxy (Bigelow's operation) or lithotrity comparatively an easy operation in the woman. We never can experience any difficulty in relieving the female bladder. The stem of an ordinary pipe, a straw, a goose-quill, any short tube over 3 inches long, will successfully accomplish this necessary operation, if we do happen to forget our catheter. Any little warty growth above the nymphæ or urethra should demand our attention, also any discharge pouring from its orifice. In ordinary vaginitis the urethra has not generally an inflamed, pouting appearance. It frequently has in gonorrhœal inflammation. Caruncle, warts, and hypertrophied states of the nymphæ occasionally occlude the orifice of the urethra.

The Vagina.—This canal, about the length of the forefinger, is narrow below, and very distensible in women who have borne children, widening at its uterine extremity. This dilatability explains, especially in atonic stages of the vagina, the large accumulation of gas or fluid that collects in the canal. The forcible and audible expulsion of air which occurs occasionally after a woman has been in the genu-pectoral position affords an illustration of these facts. The muscularity and elasticity of its walls are shown by the inherent power that the vagina possesses of expelling its contents; as, for example, expulsion of the after-birth, the speculum, or physometrous collections. It is of importance to remember that it is materially influenced by the acts of respiration, being depressed during inspiration, rising again during expiration. The position of the bladder, the distension of the rectum, the state of the superincumbent viscera, and pressure on the abdominal wall, all affect the vagina. The dense bed of cellular tissue which unites it to the base of the bladder, and, still lower down, and more intimately, to the urethra, affords a clue to the association of movement between the bladder, uterus, and vagina. Its connection posteriorly to the rectum, through the peritoneum

above and loose cellular tissue inferiorly, explains a similar association of movement with this viscus, though in a less degree. We have thus an elastic muscular tube, influenced on all sides by the surrounding viscera, having walls endowed with

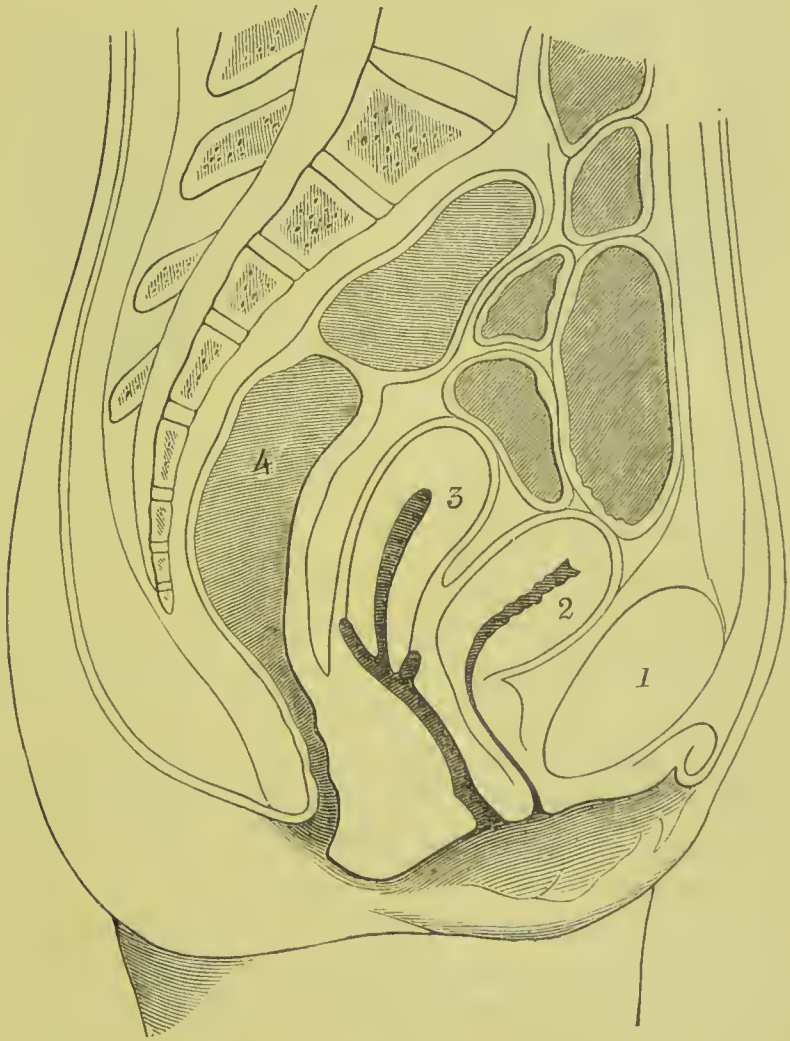


FIG. 3.—Section of the body of a woman, aged twenty-five, showing the Pelvic Viscera and Perinæum. (From 'Atlas of Descriptive Anatomy.' After Heitzman.)

considerable elasticity. It has intimately connected with it an organ whose weight and position vary from time to time, subjected to much the same influences from its surroundings as the vagina itself, and by which canal it is in great measure

supported. The only sound gynæcological view to take of the vagina is to regard it as the important bond of union between the uterus, rectum, and bladder, while forming with the perinæal body the support inferiorly of the uterus. Its

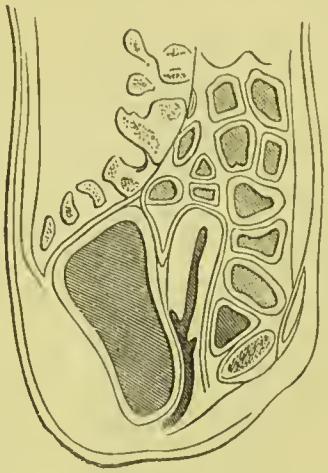


FIG. 4.—From Braune, showing Distended Rectum and Empty Bladder (Piragoff's Section).

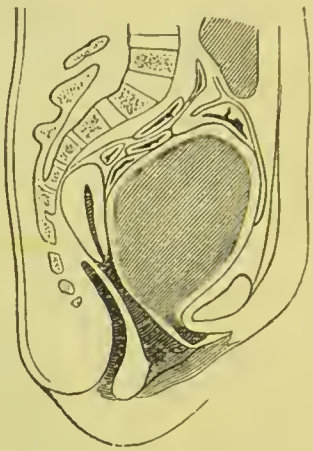


FIG. 5.—From Braune, showing Distended Bladder (Piragoff's Section).

muscular walls further endow it with this supporting power. But the terms 'canal' and 'tube' are apt to give the student an erroneous impression. True, in old multipara, in cases of procidentia, and uterine displacements, or when there are abnormal states of the bladder or rectum, the vaginal walls at the fundus may be separated. But we have only to watch the passage closing after an ordinary examination, or feel for ourselves—in the introduction of the finger—the close apposition of the vaginal walls, to be convinced that the normal condition of the vagina is one of complete closure. Two most important purposes are thus effected. Greater support is obtained for the uterus above; the entrance of putrefactive elements is prevented from below. In atonic states, when the muscularity of the vaginal walls is lost, we lose much of this advantage, the uterus sinks, and if, as unfortunately is often the case, the perinæal body has also suffered, and is deficient in tone and vitality, or, still worse, has been injured by previous deliveries,

the displaced uterus becomes still more displaced, dragging with it the anterior vaginal wall, which in its turn descends, and we have the first stage of the subsequent procidentia or prolapse. I cannot but feel that frequently with so-called 'supports,' or pessaries, this baneful result is encouraged, and that vaginal uterine support is weakened. *I speak of their misuse*, not of their scientific and legitimate application. Perhaps no gynæcological appliance is still more commonly abused than a pessary. To fix a rigid and *immovable* bar or ring in the normal vaginal passage is essentially barbarous and unscientific. Yet this is commonly done from ignorance of the first principle of a uterine lever support, until we occasionally have to cut it out of the vaginal wall, in which it has formed for itself a bed.

A few years since, I removed with much difficulty a huge vulcanite ring pessary from the vagina of a patient who had worn it without removal for five years, and recently a rubber Hodge which had remained in the vagina over eight years. It was encrusted with hardened mucus and calcareous particles. The entire vaginal cervix was eroded.

The vast extent of the mucous membrane lining the vaginal passage explains the difficulty we experience in curing vaginitis, and the severity of gonorrhœal inflammation in the female. Its folds and rugæ afford hiding-places for secretion and impure discharges, while its numerous vascular papillæ (with their investing epithelium removed), at first congested and prominent, finally become hypertrophied, and a granular vaginitis results.

The Hymen.—I have seen one remarkable case where the hymen was rigid and unruptured, only a very small aperture existing, and still the patient became pregnant. This only establishes the fact that penetration is not necessary for the act of conception to take place. Often this thickened hymen causes trouble after marriage and demands interference. In most cases the passage of an expanding speculum or the solid glass dilator, the patient being under an anæsthetic, will quickly rectify this defect. The more serious condition, 'imperforate hymen,' is dealt with in the chapter on 'Atresia of the Vagina.'

When a young girl after the age of puberty, who has never menstruated, is brought to us complaining of ill-defined abdominal pains, and, it may be, some attendant constitutional symptoms, we should always satisfy ourselves that there is no atresia of the vaginal passage nor any occlusion of the vulva. Now and then we meet a case in which rigors have occurred, and high temperature, rapid pulse, severe abdominal pain, local tenderness, with distension, or the physical signs of a tumour, are present. Here, with an imperforate hymen, we may suspect peritonitis, retro-hæmatocele, and the greater danger of septicæmia.

At the Gynæcological Society of Great Britain, I brought forward the question of the condition of the hymen as evidence of virginity or chastity. The following variations in the nature and shape of the hymen have been described by Alexander Skene, of New York: *hymen cribriformis*, hymen with a number of small openings; *hymen annularis*, hymen with one small central opening; *hymen fimbriatus*, fringed like the Fallopian tube. To those three I would add the variety I then described as *folding hymen*.

Professor Kinkead,* of Queen's College, Galway, has instanced cases in which frequent coition had taken place, and others in which labour at full term was completed, without injury to the hymen. Lombe Atthill alluded to this yielding of the hymen, during intercourse, of a rubber-like membrane, without the least cracking. In some most serious cases that have been brought to me for an opinion as to the alleged impotence of a husband or the chastity of a woman, and in which the gravest issues were involved, I found this '*folding*' form of hymen. The hymen was quite perfect and uninjured, yet a fair-sized speculum, or a vaginal dilator, could be passed into the vagina. The membrane simply folded back against the vaginal wall, returning again to its normal position on the withdrawal of the instrument. It must be remembered that the carunculæ are formed by child-bearing only, and not by simple laceration. The importance of remembering that this yielding form of hymen may exist is obvious. It may have a critical bearing on medical evidence in a case of supposed rape.

* Paper read before the Royal Academy of Medicine in Ireland on the 'Proofs of Virginity,' by R. Kinkead, December 29, 1887.

LEEDS & WEST RIDING

The following examples instanced by me in the paper I have referred to, show the need of a recognition of this condition of hymen:

I.—A patient was brought for examination who had been recently married. A coolness had arisen immediately after marriage, owing to some difficulty having occurred in intercourse, which she ascribed to ineffectual efforts on the part of her husband. But, contra, he alleged that she had resisted, and feigned such great pain at the time that he had to desist. This coolness was accentuated by a suspicion of previous impurity on the part of the woman. Upon examination, the hymen was found complete, but of the folding type. An opinion had previously been given that the woman was intact. Subsequently, disclosures proved that she had lived irregularly, and had aborted previous to her marriage.

II.—A patient wished to establish a charge of impotence against her husband. She had already been examined with this object, and pronounced intact. It was ascertained that there had been only a few occasions on which sexual intercourse could have occurred within a given number of months. She strongly resisted internal examination, lest the hymeneal proof of her virginity should be destroyed. Looking at the hymen, it was found to be uninjured and normal in appearance. Casually, during examination, a slight suprapubic enlargement was discovered. This aroused suspicion, which the appearance of the mammæ confirmed. A vaginal examination was carefully made, and a perfectly yielding hymen was found of the nature described. Though told that she was pregnant, the patient persisted in the denial of cohabitation having taken place, even to the point of endeavouring to produce medical evidence of her chastity in a case for nullity of marriage. She was, however, confined of a child at full time some six months subsequently.

III.—A most serious charge was preferred, which was in part rebutted by exculpatory evidence on oath, that a man had had intercourse with a young girl, extending over a considerable period of time. The case was one in which the gravest issues were at stake.

The girl's cause was subsequently taken up by powerful friends, and she was submitted to medical examination. The hymen was found complete, and upon this fact medical opinions were elicited that it would have been impossible, or at least improbable, that sexual intercourse could have been continued over such a length of time as that stated. She was brought for an expert judgment on this point.

The hymen was found as already described, but on a digital examination being made, it completely yielded and folded back.

Ultimately, without any force or difficulty, a fair-sized conical speculum was passed, and also a comparatively large glass vaginal dilator, without the least injury. The opinion was given that frequent coition, partial or complete, was quite feasible under the conditions, but that *the chastity of the girl was not impugned.*

Nevertheless, legal pressure, only stopping at the point of dragging an unwilling and hostile medical witness into court, was unsuccessfully exercised to force an opinion that it was not possible under these conditions that repeated copulation could have happened.

These three examples are sufficient for my purpose. In them we have the following issues involved :

In Case 1.—The impotence of the husband, and the ante-marital chastity of the wife, as bearing on the question of nullity of marriage or separation.

In Case 2.—The impotence of the husband, and the problematical doubt raised as to the parentage of the child.

In Case 3.—The perjury of the man and the chastity of the woman.

PERINÆUM.*—Sufficient has already been said of this body as a support, to indicate the necessity of attending to any old lacerations or rents. Defect of the perinæal body is one of the most frequent causes of uterine displacement. We also learn this important lesson, to always inspect the perinæum after labour, especially after first labour. Many a small rent, the source of future uterine trouble, escapes notice even after ordinary labour. Let us always regard Goodell's two invaluable hints—'*relaxation* of the perinæum' and 'immediate suture.'‡ The harmful old practice of 'supporting' it, and the negligence of postponing the closure of the rent, have cost many a woman an infinity of misery, and, through a septicæmia, induced by perinæal wounds made in operating and during the puerperal period, have caused, occasionally, peritonitis and death.

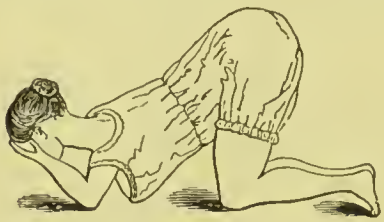


FIG. 6.—Knee-elbow position.†

The influence of decubitus on the vagina is of importance. In the dorsal position the vagina remains closed ; hence after operation we prefer to keep the woman in this position : it helps to prevent the entrance of air. In washing out the vagina with the patient in bed, the lateral or semi-prone is preferable. In examination we elevate the hips by a couch slightly raised at the foot ; this position tends, with the patient

* See chapter on Lacerated Perinæum.

† For representation of the *genu-pectoral* position, see p. 48.

‡ To 'relax the perinæum' in labour, we pass the fore and middle fingers of the left hand into the rectum, and hook forward the sphincter, while the thumb of the same hand retards and modifies the pressure of the advancing head.

in the semi-prone position, to open the vagina, relieving it of the superincumbent weight of the abdominal viscera. But we take advantage most effectively of gravity in the knee-elbow, or genu-pectoral, position: the woman converts her elbows, chest, and knees into a form of tripod (Fig. 6). The hips and buttocks are thus raised, the viscera are thrown downwards and forwards, the ovaries—as Goodell naïvely expresses it—'are put to bed.' It is this position we avail ourselves of in many vaginal operations, especially vesical, rectal, and uterine fistulæ. In it the vaginal walls separate, and most readily open when the examining finger is inserted. We have also to remember the mechanical pressure exercised on the uterus and vaginal walls by the imprisoned air which accumulates in the vagina during manipulation in this position.

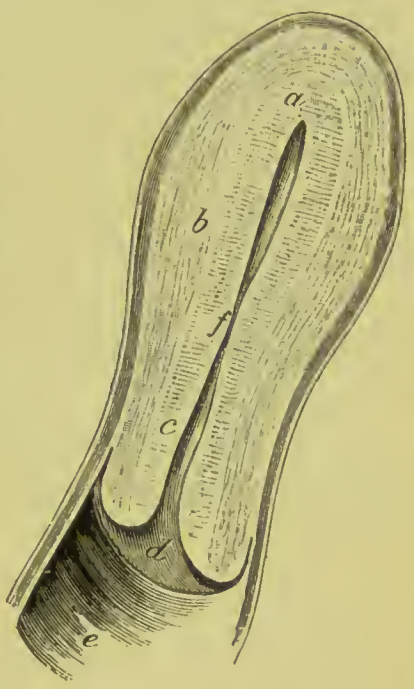


FIG. 7.—Vertical section of Uterus (Ramsbotham).

THE POUCH OF DOUGLAS.—This important space, formed by the utero-rectal folds of peritoneum, is the receptacle occasionally of an intestinal loop, a prolapsed ovary, cystic tumours, ovarian tumours, effusion of lymph, pus, and blood. Encroaching on it also we may find a retroverted uterus, and pressing upwards into it, in extreme cases of anteversion, the cervix uteri. Obstructing it posteriorly, we meet with, from the rectal side, fæcal accumulation, malignant growths of the rectum, and sacral tumours. In ordinary conditions the rectal and uterine walls of Douglas' space are in apposition; they are separated by tumours, effusions, and anteverted and anteflexed states of the uterus. To examine this space, which is always essential in any suspicious case of uterine enlargement

or rectal inconvenience, an enema should first be administered, and the rectum carefully, gently, but thoroughly, explored with the finger.* I have only to remark on the necessity for gentleness in all such manipulations. It is better first to partly introduce the forefinger of the left hand, well anointed with lard, slowly stretch the external sphincter to either side, and then gradually insert the entire finger and explore the rectum ; we may detect internal hæmorrhoids, fissure, ulcer, or stricture ; a collection of fluid in Douglas' pouch, uterine retroversion, enlargement, or prolapse of an ovary. In retro-hæmatocele, perimetric and parametric effusions, such an exploration is essential to define posteriorly the nature (yielding or unyielding) of such effusions. Thus also we may often best ascertain the sensitiveness, or degree of congestion, of the ovary.

I deal elsewhere with the therapeutical dilatation of the rectum under an anæsthetic for an excessive reflex irritability of the sphincter, with dryness of the mucous membrane, brought on occasionally by erotic practices.

THE UTERUS.—It is right that we should always have before our mind what are the dimensions, size, and weight of the healthy uterus in the young virgin, and in the adult and multiparous woman. I take those of Richet and Sappey :

UTERUS.

	Measurement in inches.		
	Virgin.	Nulliparæ.	Multiparæ.
Entire Uterus, longitudinal .	2·20	2·52	2·72
,, thickness .	0·85	0·90	1·00
,, transverse .	1·22	1·80	1·90
Cavity of Uterus, transverse .	0·60	1·08	1·24
,, length .	1·80	2·20	2·44
Isthmus uteri, length . .	0·20-0·25		0·16
,, width . .	0·16		
,, antero-posterior	0·12		
	Grains.		Grains.
Weight	360 to 1000		1200 to 1800
Capacity		2·2 c.cm.	3·5 c.cm.

* For examination by the rectum in female children, see 'Examination of a Case,' p. 90.

The uterus in the normal condition should not be felt above the pubes. It may be felt over the pubes about the third month of pregnancy, and two fingers' breadth above it at the fourth. In the natural state it lies anteverted in the pelvis. It is included between two lines, one drawn from the sacro-vertebral angle to the lower border of the pubic bone, and the other carried from the inferior margin of the fourth piece of the sacrum to the lower border of the symphysis. The axis of the uterus obviously varies with the condition of either the bladder or rectum. This is well seen if we note the position

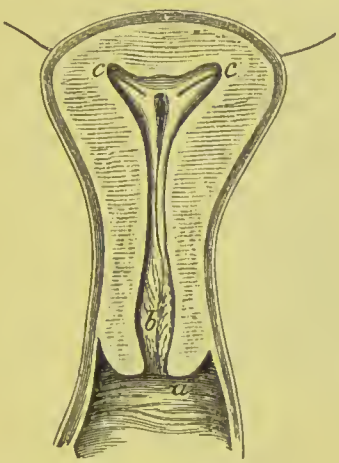


FIG. 8.—Lateral section of Uterus (Ramsbotham).

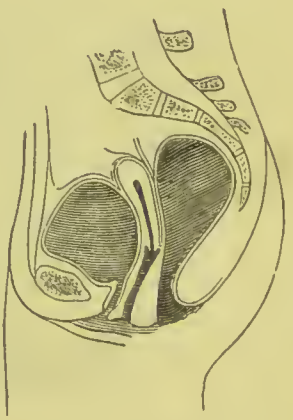


FIG. 9.—From Braune, showing Uterus pressed upon by Distended Bladder and Rectum (Legendre).

of the uterus as represented by Kohlrausch, and compare it with the diagrammatic drawing of Schultze. In the former the bladder is distended, while the latter represents the normal position of the virgin uterus. It is clinically well to remember how freely movable the healthy uterus is, *slung*, as we may say, in the pelvis, by its various ligaments. This mobility is influenced by the size of the uterus, by the condition of the surrounding cellular tissue, and the state of the pelvic ligaments—*fixation of the uterus* being one of the most important guides in the diagnosis and prognosis of various uterine affections. It is frequently fixed in fibroid enlargement, in

malignant disease, by pelvic peritoneal effusions, and in some cases of retroversion where adhesions exist. We are enabled, from the normal dimensions of the uterus, comparatively to estimate its increase in size in morbid states, notably in fibroid enlargement and subinvolution. The dimensions of the isthmus explain to us the difficulty occasionally met with in passing the uterine sound, and, still further, how essential free dilatation of the sphincter uteri is in any form of intra-uterine medication. They explain how readily the narrow canal may

FIG. 10.—Normal position of Virgin Uterus (Schultze).

be closed by reflex spasm, by irritation, or inflammation, and how imprisonment of secretions or medicated solutions occurs in the uterine cavity. Just as important is the situation of the isthmus uteri with regard to the reflected utero-rectal and utero-vesical folds of the peritoneum. Above and below the isthmus uteri the organ is free, being supported just at this part by the bed of cellular tissue which surrounds it. The uterus is thus balanced in the pelvis by the reflection of peritoneum and encircling cellular tissue. Thus is explained the tendency of the uterus to bend backwards and forwards at this situation—

a bending still further increased by the consequent constriction of the bloodvessels, at the junction of the cervix with the body, and an increase of weight posteriorly or anteriorly from congestion of the tissues, in the posterior or anterior wall of the fundus above the seat of constriction. Constriction leads to congestion, congestion to hyperplastic effusion, and both to excessive tissue-formation, which ultimately tends to contraction, and resulting flexion. Flexion produces narrowing or

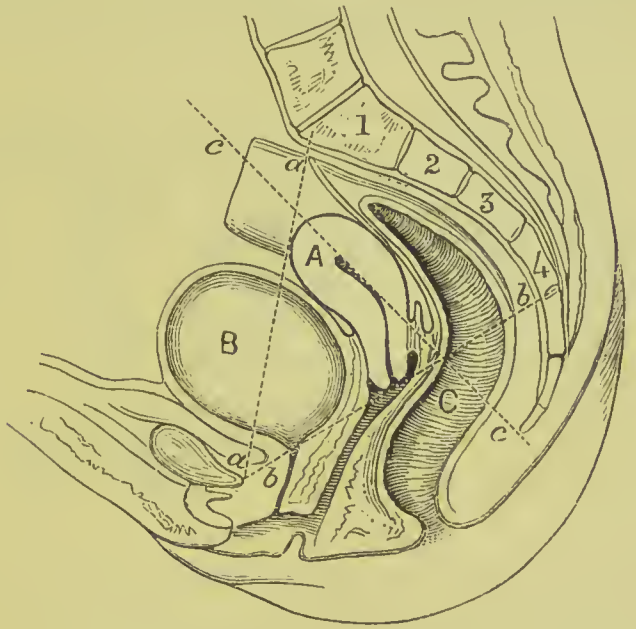


FIG. 11.—Relative position of Pelvic Viscera when the Uterus is pushed back by a distended Bladder (A. Farre).

twisting of the uterine canal at this spot, and stenosis, with all its consecutive ills.

Thus we get an insight into the natural sequence of changes which tend to produce congestion of the fundus uteri, stenosis of the cervix, hyperplastic effusion, versions, flexions, fibroid development in the uterine walls, hardness of the cervix, amenorrhœa, dysmenorrhœa, and sterility. This freedom of movement teaches us also how important it is not to overlook the uterus as a source of vesical irritation, retention, or incontinence of urine.

A lady for twelve years had incontinence of urine, until, ultimately, she was shut out from the enjoyment of society, and had always to wear a diaper or urinal; life was miserable, from the constant passing and dribbling of the urine. She had been placed under a variety of treatment. An ante-flexed uterus was gradually straightened by the use of the sound and stem pessaries. The bowel was carefully attended to, and the general health restored by suitable tonics. She recovered perfect health and comfort, nor was there at any time the least tendency to unusual irritation of the bladder.

Uterine fibroids, collections of fluid or old effusions in Douglas' space, relaxation of the utero-sacral supports, will also throw the uterus forwards, and press it against the bladder. How obviously prudent, then, is the general rule *in all cases of vesical trouble in women, where no other explanation is otherwise afforded, to make a vaginal examination and ascertain the condition of the uterus.* The ready manner in which slight swelling of the mucous lining of the narrow canal of the isthmus uteri may cause its closure and imprison secretions, forces on us the importance of the safe rule, *always to dilate the canal of the cervix before internal medication of the cavity of the fundus*, and to maintain that dilatation when there is any suspicious flow, especially of a hæmorrhagic character, from the interior of the uterine cavity.

This same fact shows how futile are those abortive attempts to treat mechanical dysmenorrhœa associated with sterility, or ordinary congestive dysmenorrhœa consequent upon stenosis of the os uteri, by any of those playful slitting operations of the cervix that do not reach the real cause of the obstruction, disappointing alike the patient and practitioner. The stress laid on the essential axiom, to thoroughly divide the canal of the cervix uteri, in cases of stenosis, when operating for dysmenorrhœa and sterility, was one of the features in the impressive teaching of the late Marion Sims, a passing tribute to whose memory and genius, having known him personally for some years I may be permitted to make.

The Uterine Ligaments and the Pelvic Fascia.—While the mechanical purposes secured by these ligaments in supporting the uterus and maintaining it in position are not

forgotten, more especially the utero-sacral, broad, and round ligaments, there are some other matters connected with their attachments and relations that must not be overlooked. The uterus is mainly prevented from falling downwards and forwards by the utero-sacral folds of peritoneum. In the dragging and stretching of these we have doubtless a ready explanation of the characteristic pain felt over the sacrum in certain cases of anteversion. The vascular and sensitive round ligaments contribute their share to the support of the uterus, and may serve to favour conception (Rainey), through the muscular

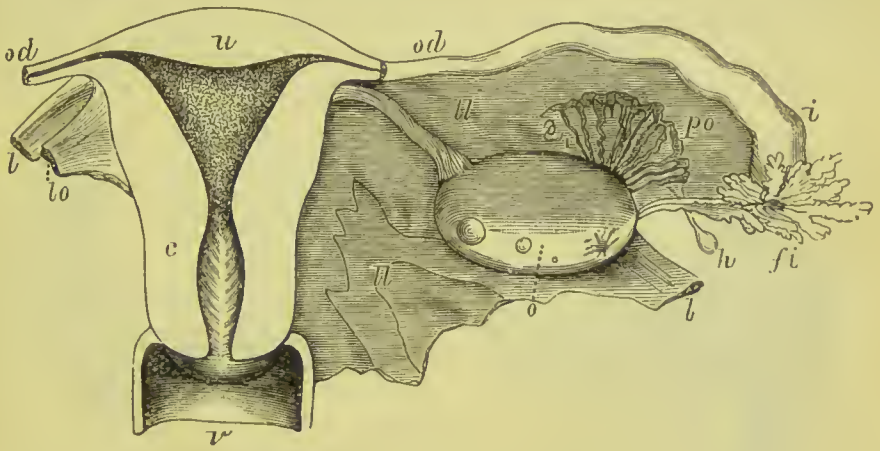


FIG. 12.—Uterus and Appendages. Diagrammatic View (Quain's Anatomy).

power with which they are endowed, in altering the direction of the uterus. When they are put on the stretch and dragged on, in displacements and in procidentia, we have a satisfactory clue to that characteristic pain running in the course of these ligaments, so frequently accompanying congested states both of the uterus and ovaries. (The reader will find these points more fully referred to in the chapter on Retroversion of the Uterus.) We can understand the association between over-distended conditions of the bladder and uterine discomfort, from the connection of the bladder and uterus through the utero-vesical ligaments, while the general distribution of the uterine and pelvic peritoneum, and the intimate association between it and the extensive fascia of the pelvis, offer a ready

explanation of the rapid transitional phases of uterine and pelvic inflammation—metritis passing into perimetritis, and general peritonitis as a sequence to both. From the broad ligaments above to the sciatic notches below, we have the complete continuity of the cellular tissue maintained. A match struck at one end of the train quickly lights the mischief, that, with lightning rapidity, often spreads, until the entire pelvic viscera are involved. They are thus pushed and pressed against each other by the effusion, the force of the conflagration being still further heightened by the adjacent peritoneum taking on inflammation, and a localized or general peritonitis ensuing.

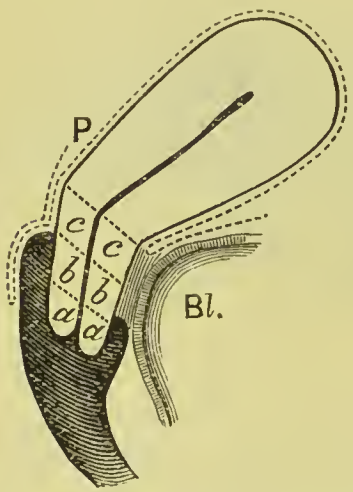


FIG. 13.—Diagram of Uterus to show division of Cervix. *a*, infra-vaginal; *b*, intermediate; *c*, supra-vaginal; dotted line shows peritoneum (Schroeder).

INFRA-VAGINAL PORTION OF UTERUS AND OS UTERI.—The infra-vaginal portion of the uterus, or that projecting into the vaginal passage, has, at the apex of the rounded cone, the opening leading to the canal of the uterus. The importance of the division of the cervix uteri into a supra-vaginal, infra-vaginal, and intermediate portion, is obvious when we consider the pathology of prolapse or hypertrophic elongation. The infra-vaginal portion varies in length, but it may be taken at from half to three-quarters of an inch. By the length and shape of this vaginal portion, and the character of the os uteri, we can form a fair opinion of the condition of the uterus. Its shape and size may be altered; either it is considerably shortened, or, on the other hand, it is greatly elongated and hypertrophied. Instead of the characteristic feeling of yielding a little to the finger, it may be either very soft, or, on the contrary, hard and resisting. Take as an example of the former condition the uterus of

pregnancy, and of the latter the hardened cervix in fibroid tumour, or the characteristic hardness of schirrus. It may be nipple-shaped, as in many cases of fibroid; the infra-vaginal portion appears to the examining finger to move over the body of the uterus, like the nipple of the breast, or a hard mammary tumour. Or the conical form may be lost, and we search for the small 'pinhole' orifice of the os uteri, and detect it at times with difficulty. Or the short cervix runs sharply to a pointed cone, in the very apex of which is the orifice of the os externum. To digital touch the os uteri varies in shape, size, and character, from the typical os uteri with its anterior and posterior lips running transversely—giving to the finger (Cruveilhier) the sensa-

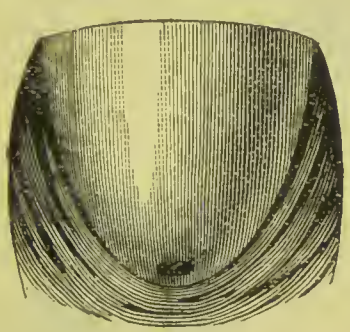


FIG. 14.—Conical Cervix.

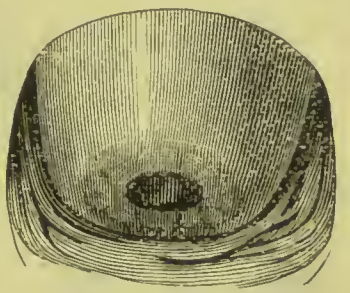


FIG. 15.—Os Uteri of Pregnancy (after Ramsbotham).

tion like the feeling of the cartilage at the end of the nose—to the mere slit, slight fissure, or small circular aperture, and occasionally absence of the orifice and atresia of the uterine canal. With this congenitally small opening and cervix we find associated dysmenorrhœa, ovarian pain, and sterility. In multipara we may find it large and dilatable, admitting the point of the finger; or fissured and lacerated as a consequence of labour or instrumental delivery. In pregnancy it partakes of the characteristic general softening of the cervix, and hence it has more of a velvet-like feeling, and is soft and patulous. It is frequently filled with a tenacious plug of mucus, which, in varying degrees of ropiness, hangs from it, and is so difficult to wipe away—a frequent cause of sterility. Or we may find the lips of the os uteri eroded, the epithelium partly denuded, and

a vascular villous surface exposed, a granular state of it and the surrounding cervix. In such a case the os uteri bleeds readily, and on the slightest touch, partaking of that congested state of the entire cervix which is present with varying degrees of cervical endometritis. In any case in which, from the nature of the discharge or other symptom, we suspect an erosion of the cervix to be present, it is safer to use the speculum, and not to trust to the feel of the finger, which is deceptive.

Uterine and Vaginal Secretions.—There are some general considerations that bear on our knowledge of normal

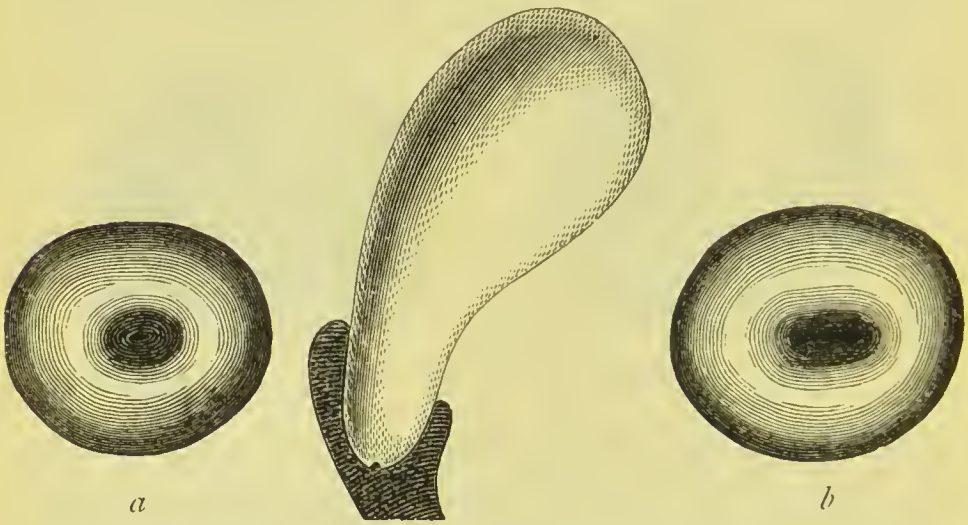


Fig. 16.—Congenital Stenosis; *a*, pin-hole; *b*, normal os uteri (Schroeder).

uterine and vaginal secretions and discharges. It is well to remember the close and intimate connection and permeability of the uterine tissues, as well as their porous nature. This is of importance, and explains those metritic troubles which arise after intra-uterine medication, independently of the passage of any fluid into the Fallopian tube. The size of the uterine veins explains the frequent occurrence of thrombosis and septicæmia. The large number of lymphatics distributed throughout its tissues, and their free communication with the lumbar and pelvic ganglia, render this organ peculiarly prone to septic

absorption. Now that the operation of curettage is so frequently performed, this anatomical fact should be kept in mind. 'Scraping' of the womb, an unfortunate term that has come into use, is so commonly resorted to that the need for special care in previous dilatation and strict antiseptic precautions are apt to be overlooked. Elsewhere in dealing with the operation of curettage this caution is emphasized. The mucous plug that fills the cervix uteri helps to ward off septic change by preventing the admission of air into the uterine cavity. In its exaggerated and altered state this secretion, which forms a most tenacious discharge, somewhat like unboiled white of egg, is difficult to remove or arrest. It comes from the cervical glands, is alkaline, is washed away by the menstrual flow, and when normal in character does not interfere with the passage of the spermatozoa. Elsewhere (chapter on Sterility) the effect of the vaginal and cervical secretions on the spermatozoa in causing sterility is referred to. The epithelium found in the discharge is dentated. The mucous membrane of the cavity of the uterus and of the Fallopian tubes secretes, on the contrary, a whitish alkaline mucous, not so tenacious, with columnar ciliated epithelium contained in it.

This secretion is often profuse, and on examination with the speculum, we see it poured out in quantity from the uterus. Very different is the secretion commonly found at the fundus of the vagina, and the neighbouring cervix uteri. It comes from the outer surface of the cervix and adjoining vaginal wall. The epithelium is squamous, the reaction is acid. The remainder of the vaginal mucous membrane secretes an acid (squamous) mucus, and the sebaceous glands of the vulva pour out an oily secretion. (I shall say more of these discharges further on.)

The Fallopian Tubes.—Situated in the broad ligaments, and floating free in the pelvis, the Fallopian tubes are liable to twists and bends, and to contract adhesions to adjacent parts, while their connection with the ovaries and uterus renders them liable to every influence which any change in position of

these latter organs exerts. Owing to the small calibre of the uterine portion of the tube (0·12 of an inch in diameter), and the fact that its orifice is filled with mucus, it follows that fluids are, as a rule, prevented from passing from the uterine cavity into the Fallopian tube. But if this plug be disturbed, or the tube be more patent than usual, fluids may then readily find their way into the peritoneal cavity.

Tyler Smith, recognising the patent condition of the uterine orifice, suggested catheterization of the tubes in cases of obstruction, tubal gestation, etc. Matthews Duncan drew attention to this abnormal patency, and pointed out that it affords an explanation of the passage of the sound out of the uterus in

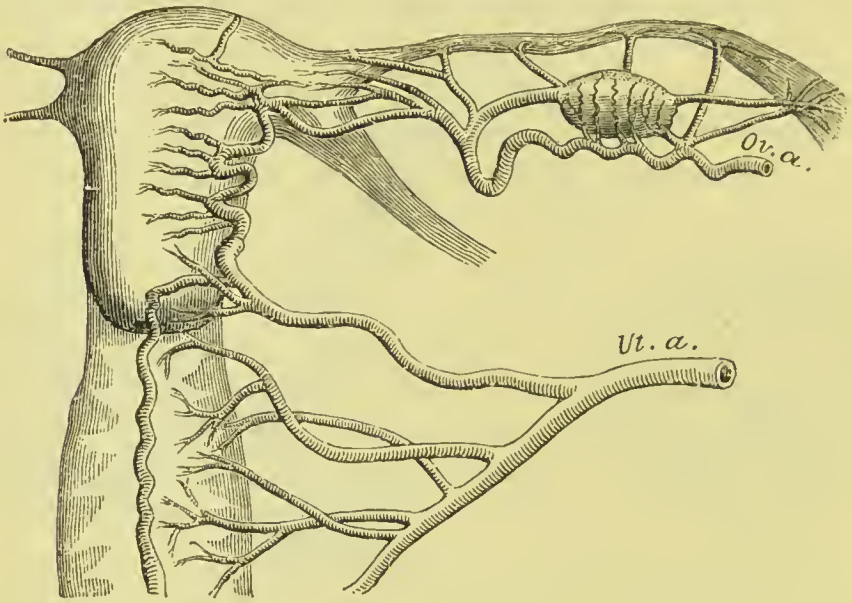


FIG. 17.—Diagram of the Vascular Supply of the Vagina, Uterus and Ovary (modified from Hyrtl).

certain cases. This I satisfied myself of in a woman sent for operation for ovarian tumour. The sound passed on several occasions readily its entire length, though the uterus was not enlarged, as was proved on operation. The explanation lay in the passage of the instrument into the peritoneal cavity through the patent tubal orifice.

Repeated attacks of ovaritis, recurrent pelvic peritonitis with consequent adhesions, influence the position of the tubes and their power of grasping the ovary. We frequently find thickened states of the broad ligaments, adherent ovaries, contractions and adhesions in the vaginal roof in cases of sterility.

FIG. 18.—Ovary of a woman twenty-three years old, with the Fallopian tube in position—natural size (Bland Sutton).

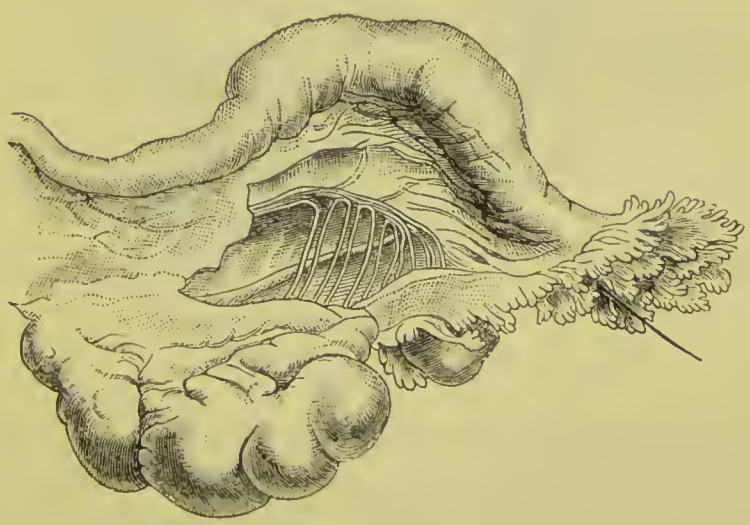


FIG. 19.—Ovary of a woman forty years of age—natural size (Bland Sutton).

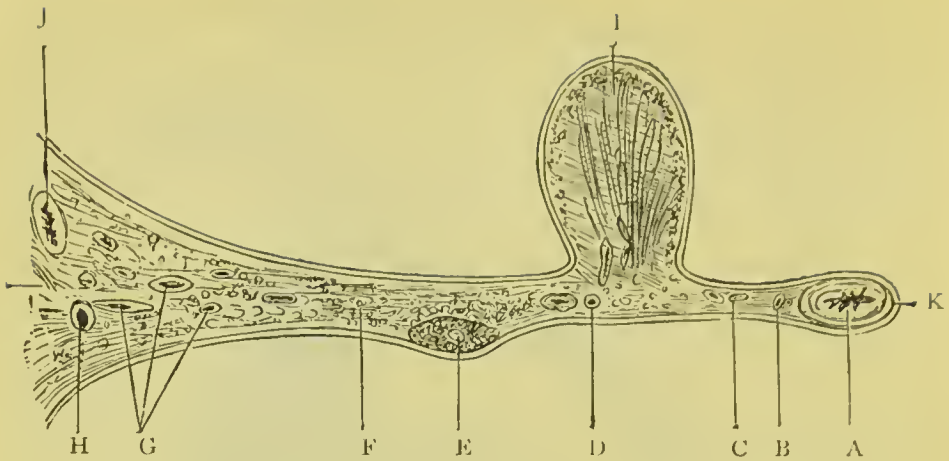


FIG. 20.—Vertical Section through the broad ligament (Anderson).

A, Fallopian tube; B, tubal branch of ovarian vessels; C, parovarium; D, ovarian artery; E, round ligament and funicular vessels; F, connective tissue and unstriped muscle (utero-pelvic band); G, uterine veins; H, uterine artery; I, ovary; J, ureter; K, reflected peritoneum.

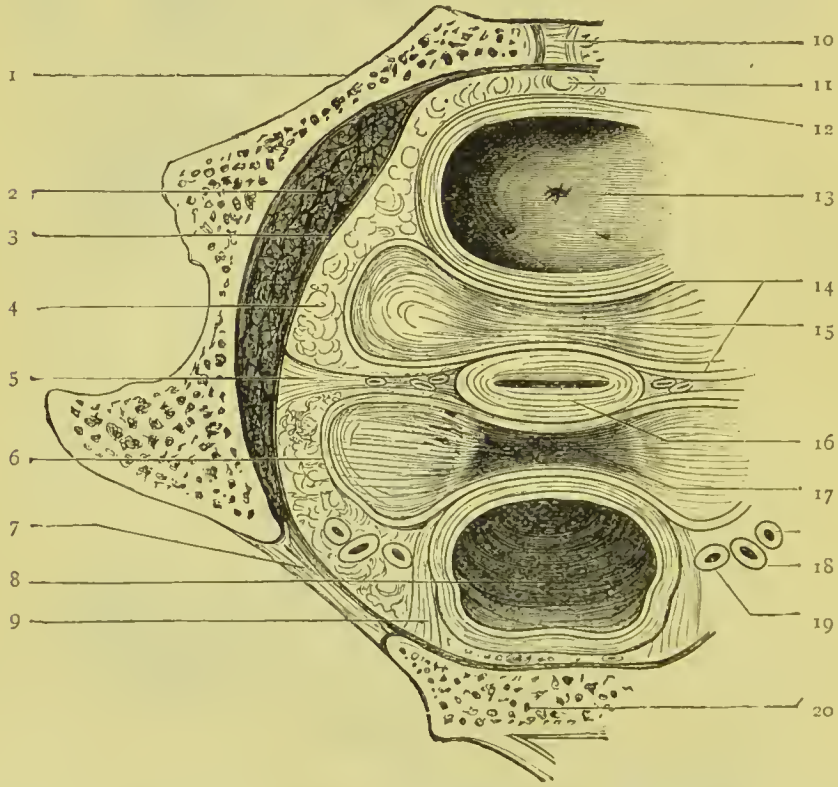


FIG. 21.—Section of the Pelvis showing the ligaments of the uterus (Anderson).

1, Os pubis; 2, obturator internus; 3, obturator fascia; 4, sub-peritoneal tissue; 5, utero-pelvic ligament; 6, peritoneum; 7, sacro-sciatic ligament; 8, rectum; 9, utero-sacral ligament, running forward into recto-uterine ligament; 10, symphysis; 11, revesical fat; 12, bladder wall; 13, vesical cavity; 14, peritoneum of utero-vesical pouch; 15, utero-vesical ligament and broad ligament; 16, uterus; 17, Douglas' pouch; 18, vessels; 19, ureter; 20, sacrum.

The menstrual secretion may be retained in the Fallopian tube. This retention and various other causes may lead to its dilatation, while fluid accumulation and cysts are occasionally the cause of its distension, as occurs in hydro-salpinx, hæmato-salpinx, pyo-salpinx. The causes and consequences of tubal pregnancy are discussed in the chapter dealing with this complication. The occurrence of salpingitis, as a consequence of inflammation of the cavity of the uterus, and especially as a sequence of gonorrhœal infection, is also readily understood.

The Ovary.—The ovary at either side of the pelvis is in its normal state about the size of a large almond, weighing from 80 to 90 grains. Its exact position is determined by the surrounding viscera, though the gland as a rule lies posteriorly and laterally in the pelvis, the left being in close proximity to the rectum, and about 1 inch from the uterus. According to Henle there are some 72,000 Graäfian follicles in the two ovaries; the escape of the ovules and the ovum gives us the false and the true corpora lutea. The process of ovulation is accompanied by the rupture of one of these follicles. These periodical ovarian enlargements are attended by increased flow of blood to the ovary, temporary congestion, and an increase in its weight. Should the Fallopian tube not grasp the ovary when this follicle has ripened and burst, the ovule may fall into the peritoneal cavity, or blood may escape into it. The ovary and the uterus have such intimate connections, both in their peritoneal coverings and in the arterial and venous supplies (the utero-ovarian arteries and veins), that any congested condition of the one must react on the other. This is best seen in the contemporaneous and relative increase in size of the ovarian arteries and veins during gestation. Taking this vascular association of the ovary and uterus into consideration, with the equally close lymphatic distribution of both ovarian and uterine lymphatics in the lumbar glands, we have no difficulty in understanding how uterine purulent and septicæmic processes influence the ovaries, or the manner in which such a serious condition as spreading gonorrhœal in-

flammation is generally attended by a greater or less degree of ovaritis. In the large vascular supply of the ovaries, and the periodical alteration in the quantity of blood circulating through the ovarian stroma — a blood-supply which is frequently depraved—we have explained the many morbid changes occurring in the ovarian tissues, which are associated constantly with vicious menstruation. On the one hand, we find congestive states leading to hypertrophy, ovarian apoplexy, rupture of vessels, the formation of cysts or fibromata; on the other, anæmic conditions tending to atrophy, and, in milder degrees, irregular, arrested, or suppressed menstruation. Our knowledge of the physiological function discharged by the ovaries, and the intimate dependence of the woman's physical and mental health on the nature of the menstrual act, forces us to regard, as of primary importance to a woman's physical well-being, the health of her ovaries, and the correct discharge of the function of ovulation. One of the greatest advances in gynæcological science has been the operation of removal of the ovaries, first proposed by Battey, of Georgia, for inducing the premature change of life in woman, in various morbid states of both uterus and ovaries. With this step the name of Lawson Tait is also connected, as insisting on the part played by the Fallopian tube in the act of menstruation, and the need for its removal together with the ovary, in the operation for removal of the uterine appendages.

I refer later on in treating of the disorders of menstruation to the views of Bland Sutton and Johnstone on the changes that occur during menstruation in the uterine mucous membrane.*

Landois and Stirling, in the 'Text-book on Human Physiology,' adhere to the views of Kundrat and Engelmann, that there is a fatty degeneration of the superficial layers of the mucosa, the new mucous membrane being developed from these deep layers when the period is over.

With regard to the relation borne by the ovaries to the general well-being of the woman, and the connection between these circulatory changes and those occurring in the Fallopian tubes and uterus, I think it well to epitomize from this text-book this summary of views bearing on the subject:

* Refer here to chapter on Disorders of Menstruation, p. 139.

1. The partial contraction of the muscular tunic of the Fallopian tube assists in the propulsion of the ovum.
2. The bloodvessels of the Fallopian tubes are then injected, possibly by the constriction of the vessels in the broad ligaments, by their non-striated muscular elements. (Rouget.)
3. Pflüger's view is that the physiological 'freshening' of the uterine mucous surface affords nutriment to the newly-received ovum.
4. Reichert's view is (and that of Engelmann and Williams) that the change in the uterine mucous membrane is a sympathetic one, resulting in sponginess, vascularity and swelling. Thus is formed a *membrana decidua menstrualis*, which is not disintegrated if the ovum be not fertilized, and hence there is no external discharge, this negative sign being the proof of fertilization under normal conditions of health. The occurrence of ovulation and menstruation may not be synchronous, and hence there may be ovulation without menstruation, and *vice versâ*.

It is not to be forgotten that the uterus is capable of contraction under the influence of sexual intercourse, and the expulsion of some of the uterine mucus may thus take place. This reflex contraction may be associated with corresponding

FIG. 22.—Uterus during Menstruation. A, mucous of the neck; B, mucous of the body; C, thickness of the mucous; D, tissue proper; E, thinning of the neck and at the Fallopian tubes (Gallard).

contraction of the Fallopian tubes. This has an important bearing on the question of sterility and the effect of excessive

or imprudent intercourse, which may thus cause loosening or expulsion of the ovum.

I recently had under my care a married lady, who, under certain influences, and generally associated with the catamenial periods, had violent uterine contractions, in which the vagina participated. I have seen the uterus driven down to the vulvar orifice, and it was difficult at these times to keep a speculum in the vagina. A digital examination was sufficient to bring on these contractions. Fearing that there might have been some intra-uterine polypus or fibroid, I dilated the uterus and explored the cavity, but there was no intra-uterine growth. She suffered from an old laceration of the cervix and some corporeal endometritis and menorrhagia. Free application of nitric acid to the uterine cavity materially benefited her, and relieved the spasms.

The Rectum.—In practice, the close sympathy that exists between the uterus and the rectum is often overlooked. I enter into the practical bearings of this sympathy on rectal operations in the chapter on the Rectum. The habitual neglect of the lower bowel, which is frequently met with in women, is the cause not only of constitutional, but also of many local disorders. Various dyspeptic troubles—headache, flatulent pains, functional heart palpitations, hæmorrhoids—follow from the congested portal system. Rectal irritation, associated with a congested and dry condition of the mucous membrane, is constantly found a companion of different vaginal and uterine disorders. One organ reacts on the other, and the recognised difficulty in curing any rectal affection while a uterine diseased state continues, renders it imperative to relieve the former before we can hope permanently to benefit the latter. This is especially true of fissure, strictured states, fistula, ulcers, pruritus. But perhaps the complication most commonly met with is hæmorrhoids, both external and internal. These are more distressing when there exists at the same time any version or flexion of the uterus, particularly retroversion, the uterine pressure aggravating the rectal pain and discomfort. The existence of a rectocele, complicating uterine prolapse or injury to the perinæal body, should not be forgotten. The rectum is also encroached on, and the act of defæcation interfered with, in pelvic peritonitis with effusion, uterine fibroids, and by various accumulations in Douglas's

pouch. In making our first thorough examination of a gynæcological case, having previously by an enema emptied the rectum, we gain our most important information by a careful rectal exploration.*

The Urinary Organs.—The gynæcological student must have a sound practical knowledge of the anatomy of the kidneys, ureter, and bladder. The more abdominal surgery advances the more we see the importance of such an accurate acquaintance with the position and relation of these viscera. The various morbid states of the kidney, such as movable kidney, hydronephrosis, pyonephrosis, perinephritic abscess, cystic disease, which are liable to be mistaken or overlooked in diagnosis, demand this. It is a matter of common occurrence for renal disease to complicate pelvic disorders. It is often extremely difficult to differentiate between the two. The same observation applies to the differentiation of renal and hepatic enlargements or tumours of these viscera. The frequent occurrence of a renal calculus giving rise to various reflex or transferred pains; the possibility of a renal tumour being mistaken for an ovarian cyst; the different morbid conditions for which movable kidney is liable to be mistaken—such, for example, as malignant disease of the colon, tumours of the gall-bladder, fæcal tumours, splenic tumours—are instances of this. But it is especially in view of the various operative procedures that have of recent years been undertaken for the relief of renal affections, both in the kidney itself and the ureter, that the gynæcologist must remember his responsibility, as physician in diagnosing the disease, and advising an operation, or as surgeon in performing it. Only those who are frequently called upon to make a diagnosis can realize the difficulty there is in arriving at an accurate conclusion in obscure cases of renal enlargements, if they be complicated with evidence of pelvic mischief, either remote or immediate. The vital importance of extreme care is obvious, as life may be sacrificed from the want of a simple exploratory

* See p. 90.

incision, or the use of an aspirator. The surgical anatomy of the ureters has of recent years come to have a special importance to the gynæcologist.* This has resulted from the surgical measures necessitated by the implication of the ureters in affections of the pelvic viscera, and the various operative measures which have been taken by different operators to avoid injury to them, or to repair them when accidentally or unavoidably wounded. Also, the examination of the bladder by

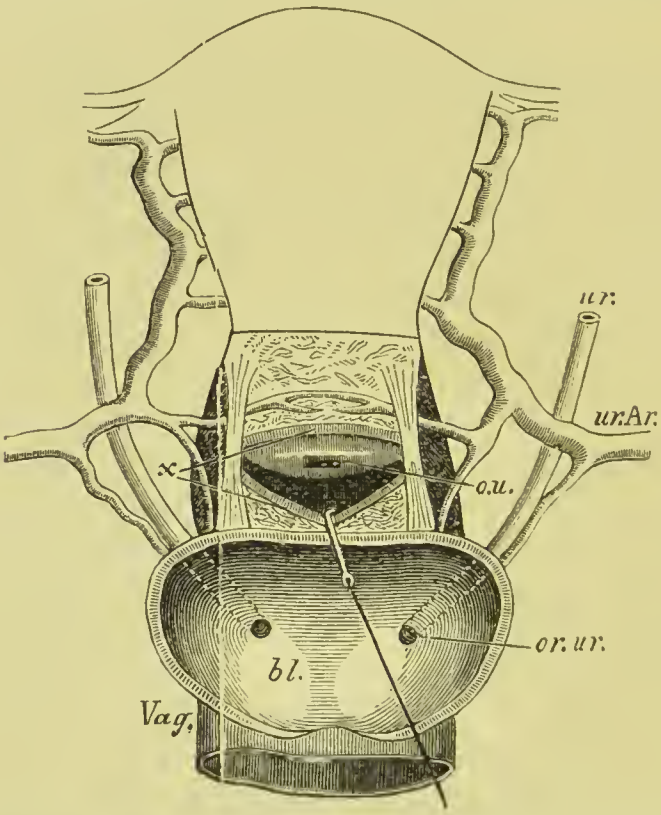


FIG. 23.—Showing relation of Uterus to Uterine Arteries, Ureters, and Bladder (Greig Smith).

endoscopy, and the catheterization of the ureters for diagnostic purposes, demand a correct acquaintance with their position, cystic openings, and relations. Greig Smith quotes Collier's and Morrison Watson's description of the course of the ureters:

'Entering the pelvis, the ureter crosses the common iliac near its bifurcation, and then runs downwards and forwards in front of the internal iliac and its

* See chapter on Ureteral Surgery.

anterior division. Where this division of the internal iliac splits into its branches, the ureter bends backwards, and is crossed on the inside by the uterine artery. The ureter then turns forward at the level of the internal os, and, at a distance of about half an inch from it, runs along the side of the vagina for a little way, finally bending over it so as to enter the junction between the vagina and bladder. It perforates the latter organ just above the middle of the anterior vaginal wall, and obliquely enters the viscus a little lower down.

Howard Kelly, of Baltimore, whose ingenious method of exploration of the bladder we shall have to refer to again, has added to the knowledge gained by the work of Grünfeld, Newman, Pawlik, Sanger, and Schultze, and I quote here his description of the course of the ureter:

'The ureters are flattened white cords, about ·5 cm. in diameter, from 25 to 30 cm. in length, extending from the pelvis of each kidney high up in the loins under the vaulted arch of the thorax down to their embouchure in the urinary bladder. Each ureter is naturally, and for practical purposes, divided into two parts—an abdominal and a pelvic portion—by the bend over the common iliac artery at a plane about 3 cm. above the brim of the superior strait.

'The pelvic portion is not more than 10 or 12 cm. long, while the abdominal portion is from 12 to 15, or more.

'The most inaccessible portion is that nearest the kidney, where it lies concealed by the ribs, from 4 to 4·5 cm. from the median line, and about the same distance posterior to the anterior face of the vertebral column.

'The middle part of the abdominal portion lies from 2·5 to 3 cm. from the median line, on the psoas muscle, on a plane on a level with the anterior faces of the vertebral bodies. The ureter crosses the psoas obliquely to the internal iliac artery at or just above its bifurcation, where it is about 3 cm. from the middle of the promontory of the sacrum. The course is thus obliquely downward and inward, exhibiting a slight inward convexity, and always with marked convexity forward, due to its course over the psoas.

'The ureters lie in the loose cellular tissue back of the peritoneum, and partly under the caput coli and the ascending colon on the right, and descending colon and sigmoid flexure on the left side.

'The abdominal ureter holds no relations to important vessels until joined somewhere about or above the middle of its course by the ovarian vessels, artery, and vein, which cross it to descend into the pelvis along its outer border. At the brim of the pelvis on the right side the ureter lies just behind the peritoneum, where it can be seen with the ovarian vessels. The peritoneum can be incised at this point, and the ureter thus easily laid bare.

'On the left side the relations of the ureter to the sigmoid flexure and the rectum depend entirely upon the length of the meso-sigmoid and the variable position over the superior strait at which the rectum enters the pelvis. Thus in one case the ureter lies behind the sigmoid veins and arteries, and in another directly behind the intestine.

'After crossing the psoas it crosses the common iliac artery obliquely above

its bifurcation, dropping into the pelvis at this point. The pelvic portion of the ureter usually lies at first to the inner side of the internal iliac artery; occasionally it lies to the outside; it is again crossed by the ovarian vein and artery, which leave it at an acute angle just above the brim of the pelvis (the brim as made by the muscle, and not the bony pelvis). The pelvic portion of the ureter descends to the floor of the pelvis in the loose cellular tissue in a forward direction; it passes directly under the uterine artery and the base of the broad ligament, alongside the upper lateral vaginal wall, and finally curves in over the anterior vaginal wall, following its uppermost converging folds, and terminates in the bladder, where the two ureteral orifices are connected by the inter-ureteric ligament.

'The ureter can be palpated through the anterior vaginal wall from its

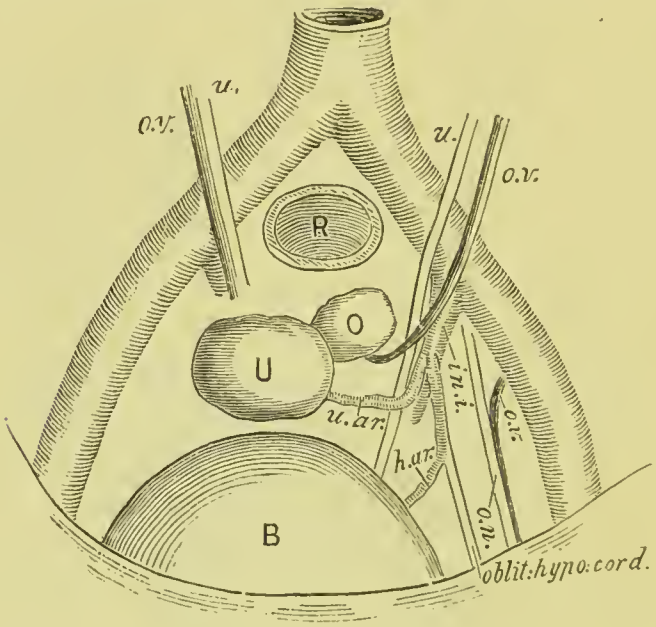


FIG. 24.—Pelvic portion of Ureter from below. *u.*, ureter; *o.v.*, ovarian vein; R., rectum; O., ovary; U., uterus; B., bladder; *u.ar.*, uterine artery; *o.n.*, ovarian nerve.

terminus in the bladder up to the point where it passes beneath the broad ligament. It is rolled in the loose cellular tissue under the index-finger, or often better bimanually under two fingers, or in advanced pregnancy on the head of the child like a narrow tape or flattened cord, without hardness. It must not be mistaken in this position for the obturator artery or nerve, or the upper border of the levator ani, or fibres of the obturator muscle, or the rim of the foramen.

'A diseased ureter becomes nodular and thickened, and is peculiarly prone to be mistaken for a cellulitis or an adherent ovary. I have demonstrated this fact on numerous occasions for a number of years.

'A large percentage of cases under treatment to-day for cystitis and for

irritable bladder are in reality tender thickened ureters, and an intelligent palpation will detect the tube now hard and cord-like, bringing out the characteristic complaint of intense desire to urinate. One patient in whom I persisted in making the examination was actually forced to urinate on my hand.

'An enlarged ureter can easily be further palpated per rectum behind the broad ligament, and followed from there up over the posterior pelvic wall, as I was also able to demonstrate on a case in the hospital.

'I have found that *the normal ureter can also be traced and minutely examined in the upper part of the pelvic course by introducing a ureteral catheter through the urethra and bladder into the ureter, and carrying it up to or over the brim of the pelvis.* When an inflexible catheter is thus carried over the brim, the

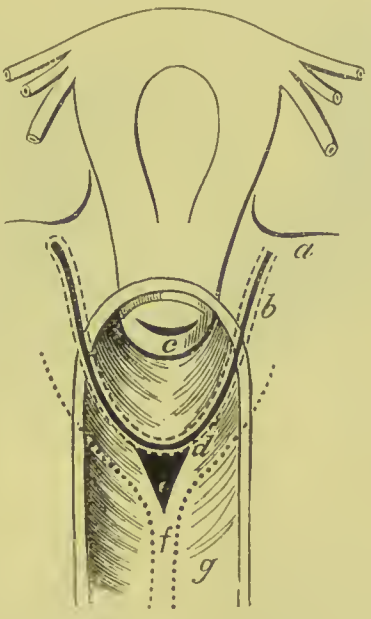


FIG. 25. — Diagrammatic figure to show the portion of the Ureter accessible to the examining finger. *a*, Base of round ligament ; *b*, ureter and (*d*) intra-ureteral ligament ; *c*, trigone ; *f*, urethra ; *g*, vagina.

ureter is displaced upward and straightened out. It can now be palpated almost as plainly through the rectum, on the catheter, and any alterations in its calibre noted almost as minutely as when laid bare by dissection.

'At the pelvic brim the ureter can also be felt per rectum.

'It can be felt at the brim less distinctly through the anterior abdominal wall, where it can also be followed for 6 or 8 cm. up toward the kidney, while the catheter remains in place.

'*My landmark for the upper portion of the pelvic ureter is the internal iliac artery, which can readily be felt per rectum.*

'In some cases the artery can be palpated up to the common iliac artery. Close along the inside of this artery the ureter can be felt ; if nothing is felt, the conclusion that this portion of the ureter is not enlarged is safe.

'Among the efforts made to locate the abdominal portion of the ureters by surface landmarks, I know none which have thus far proven satisfactory.

'*My own method is to locate the promontory of the sacrum by pressure through the abdominal wall, and from this to locate the point at which the ureter enters the pelvis from* 3 *to* 3½ *cm., outside of, and a little below, the promontory.* By pressing deeply at this point, the fingers at once recognise the pulsations of the common iliac artery, a sign that the correct spot has been found. A large ureter can be felt at this point through thin walls. The patient will always complain of severe pain, and often of a desire to urinate when a sensitive or inflamed ureter is touched.'

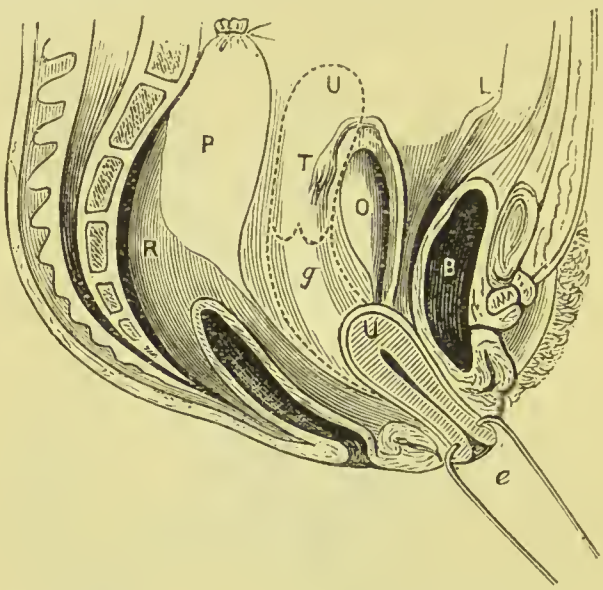


FIG. 26.—Showing the disturbed relation of parts when the Uterus is drawn down (Greig Smith—after Savage). R, rectum ; U, uterus ; B, bladder ; P, peritoneum ; T, Fallopian tube ; O, ovary.

The symptoms due to a stone in the kidney in a young girl might be attributed to spinal disease, or to uterine or ovarian affection, that may possibly complicate the presence of calculus. The various operations of hysterectomy, especially that by the supra-vaginal method, demand an intimate knowledge of the relation of the bladder and ureters to the uterus and its appendages. I have thought it desirable thus to insist on the advantage it will be to the student in his after-career to take every opportunity of studying all these relationships, and noting any abnormalities of these viscera or in their vascular supply, while prosecuting his anatomical studies.

CHAPTER II.

FIRST STEPS OF EXAMINATION OF A CASE.

As in the case of other organs, that physician is most likely to arrive at a sound basis for his treatment of the uterus who makes his *first* examination a systematic and careful one. Many an error in diagnosis might be saved if we adhered to this rule. One word of caution is needful. While unnecessary examinations of the uterus are, above all things, to be deprecated, on the other hand, nothing can be more dangerous to a medical man's reputation than the neglect of making a careful vaginal examination, when he is in doubt as regards the nature of a difficult case, with symptoms clearly pointing to some affection of the pelvic viscera. Want of caution in this respect has brought many a young medical man into disgrace. Take, for example, hæmorrhage, or dysmenorrhœa, the result of undetected uterine polypus; a vaginal discharge attendant upon pelvic cellulitis; irritability of the bladder, due to a flexion or version of the womb, or to a pelvic hæmatocele, or a uterine fibroid; some difficulty in defæcation, attendant on a tumour, pelvic effusion, or uterine displacement; frequency in making water, due to undetected stone in the bladder; a prolonged back-pain, the result of retroversion of the uterus. Perhaps the most serious consequence of all is the non-discovery of malignant disease. This I have known to occur on several occasions. There is no retreat from the unpleasant position in which such an oversight places the medical adviser. These are just a few instances of the many cases in which the

want of a careful vaginal examination, in the first place, is certain to reflect discredit, through some undiscovered morbid or abnormal condition of bowel, uterus, or bladder.

The appliances necessary to make a first examination, in the great majority of cases, are :

Suitable bed or couch.	Speculum forceps.
Tape-measure.	Cotton-wool (absorbent).
Stethoscope or phonendoscope.	Uterine sound.
	Oliver's test-papers.
Specula (vaginal).	Clinical thermometer.

For further examination :

Cocaine.	Tupelo or sponge tents.
Chloroform or ether and inhaler.	Uterine dilators.
	Uterine holder or tenaculum.
Aspirating needle or subcutaneous injection syringe.	Tent-introducer.
	Uterine probe and sound.
	Microscope.

I assume a patient consults us for any uterine or ovarian disease, and one requiring a careful examination, and in which an exhaustive differential diagnosis must be made. We first take the history of the case somewhat in this form :

Age; occupation; married or single; number of pregnancies; number of abortions; date of last pregnancy; if nursing; age at which menstruation began; dates of last three periods; character, quantity, quality, regularity of the flow, and if associated with pain; if there be pain, its nature and seat; discharges, whether inflammatory, leucorrhœal, sanguineous; hereditary tendencies in the family history; state of the bowel; sleep; appetite; exercise (power of walking). It may be well to make a few brief observations on each of the facts thus elicited at our first interview.

HISTORY OF THE CASE.

Age.—The age of the patient has an important bearing on the diagnosis and management. Take, for example, the time

of puberty, with its physiological influences, the commencement of the function of ovulation, all the sympathies which are awakened at this period, the sudden bursting into womanhood, the rapid development of the tissues, and the constant demand for renewal on the blood; or that equally critical period of life, the menopause, when the active discharge of the function of ovulation is ceasing, and the child-bearing epoch is about to end. With this second complete alteration in the system, we have local determination of blood at irregular intervals to the various organs, more especially the ovaries and uterus, sometimes culminating in local apoplexies, congestion of the ovaries, menorrhagia, the growth of uterine fibroids or polypus, the commencement of malignant disease.

At this period, also, we are likely to meet with vicarious hæmorrhage from distant organs, epistaxis, hæmatemesis, hæmoptysis. The question of there being any such thing as *vicarious hæmorrhage* has been raised by Wilks (see Robert Barnes' paper, British Gynæcological Society, April, 1886). For my part, I have not the least doubt of its occurrence. I have had several cases in which it was present, as a consequence of suppression of menstruation, or during the commencing irregularity of the catamenia at the menopause. I have seen it in the form of epistaxis, hæmatemesis, and hæmoptysis.

One lady I attended for some years, and whenever the catamenia were suppressed for a few periods, she had violent hæmoptysis, alarming to herself and friends. This quite ceased with the end of the climacteric, and she remained in perfect health for years. The hæmorrhage generally lasted for two or three days, and was always checked by a mixture of gallic acid, matico, ergot and digitalis. Before the hæmorrhage, she suffered from fulness in the head and shortness of breath. She was otherwise a robust woman and in good health.*

Esthiomenic Menstrual Ulcer.

I this year (1896) have had under my care a young lady, aged twenty-six. She was attacked in the spring of 1895 with a small ulcer on the inner side of the cartilage of the nose. This resisted various forms of treatment, assuming a tubercular or lupoid character. At each menstrual epoch redness and pain supervened, the ulcer then becoming very irritable, and ultimately taking the form of a malignant ulcer, with a hard, dark-coloured, and depressed slough,

* See chapter on Menstrual Disorders for remarks on *Pigmentation during Menstruation*.

with raised edges and inflamed circumference, threatening the nose with destruction. The agony the patient suffered at the menstrual period was great. No treatment arrested the extension of the slough save complete extirpation with the knife, and the application of nitric acid or chloride of zinc paste to prevent its recurrence. Seventeen such operations had to be performed before the nose was ultimately cured. Only very slight deformity, however, remained. The portions removed were several times subjected to bacteriological examination, but nothing definite could be discovered. The ulceration spread from one nostril to another, at one time reducing the skin of the column to the thickness of about two lines, and extending at either side to the lip. There was no doubt of the esthiomenic nature of the ulcer and its malignant tendency, or of its association with menstruation.

During the climacteric, women may be troubled with various head-troubles, flushings, pain, migraine, and other important disturbances of the nervous system, as convulsions or paralysis. Climacteric insanity manifests itself in taciturnity, melancholia, with or without delusions, and hypochondriasis. The patient has the conviction that she is guilty of some unpardonable sin against her husband or family. Suicidal mimicry may be present, or true suicidal impulses. Such attacks of depression or exaltation may be absent or greatly lessened in the intervals between the menstrual periods, and at these epochs the fits may come on or be accentuated. All such cases during the climacteric require exceptional watching and care. They are typically cases for nursing and supervision in a medical home, and, save in rare instances, they are not to be treated as insane women.

A very large proportion recover when the climacteric period has passed by. There is the intervening period of active ovulation, during which—the child-bearing period—the woman is liable to any of the accidents or results that follow from deviations from the normal physiological act. It is during these years that we have to deal with amenorrhœa, dysmenorrhœa, menorrhagia, leucorrhœal discharges; ovarian troubles, as oöphoria, ovaritis; ovarian morbid growths, ovarian solid and cystic tumours; uterine congestions, inflammations, growths, alterations in position, flexions and versions, and all the results of these abnormal conditions. More especially if the woman be married, we meet with those affections which

are often directly or indirectly connected with the married state: vulvar and vaginal inflammation, uterine discharges, specific sores and gonorrhœa, perinæal laceration, hæmorrhoids, vesical and urethral complications. Both in the single and married woman, malignant or non-malignant growths are more apt to occur, and in the married the various disorders consequent on lactation.

Pregnancies and Abortions.—The number of pregnancies, with their successive effects on the constitution of the woman and the uterus, is a point of considerable moment. The history of lacerations of the cervix, subinvolution, fistulæ, vesical troubles, mammary growths, should be traced. The relation of fibroids to the pregnant condition may be ascertained. Repeated abortions and miscarriages lead us to suspect either a habit, or the presence of syphilitic taint, as cause. They may explain some accompanying constitutional fault, and arouse our suspicion of latent renal mischief, and on examination of the urine we detect albuminuria or the urine of granular kidney. Inquiry into the possibility of a specific taint is assisted by putting cautious questions concerning the living and dead children, the dates of the abortions, and the various periods of pregnancy at which they took place.

Occupation and Habits.—This is the most important consideration after the patient's age; whether she leads an active or sedentary life; if she have to stand much, or do a great deal of stooping work; if she sit up late at night, dissipate, or spend a considerable time at the piano, painting, or the sewing-machine; in short, how she generally occupies and amuses herself. This inquiry naturally touches on her daily habits—exercise, clothing, diet, and bathing. We may question her or her friends as to the outdoor exercise taken daily; elicit information on such important matters as tight lacing, tight garters, the manner of suspending the under-clothing, the wearing of flannel, and if the temperature of the extremities be attended to. We learn the nature of her food—if healthful, simple, and nutritious, or trashy and indigestible; the times of

meals, and the interval between; the amount of alcohol and the quantity of tea consumed. The character of the patient's appetite, the hours of rest, and the amount of sleep are thus arrived at. Not the least important matter to elicit is, the care bestowed on the skin. The resort to a daily bath, suited in its degree of temperature to the temperament of the individual, is perhaps the most healthful custom a woman can adopt.

Every woman should have in her bedroom a sponge-bath. If she cannot take the cold bath, she can regulate the temperature of the water, according to the time of year, from 60° upwards, and have proper sponging of the body, followed by friction with a rough towel. Sea-bathing, again, is most bracing and suitable for many constitutions. It is quite as unfit and hurtful to others. It is well to find out exactly how the sea air and sea-bathing affect individuals before we either permit or recommend it.

Sea air has a special effect on menstruation in some women. I have had several cases in which irregularity occurred as a consequence of change to the seaside and sea-bathing. As a rule, a bracing climate and mountain air are to be preferred in cases of erratic or suppressed catamenia.

*Menstruation.**—With young girls we frequently find a difficulty in coming to any definite conclusions regarding the regularity, the quantity, and the quality of the menstrual flow—all of them equally important facts. At times we are wilfully deceived, and this must always be remembered in cases in which the least suspicion of pregnancy exists. Here we must place little reliance on assertions, and ascertain, if possible, through a mother or relative, if the patient do become unwell. Mothers are at times careless in watching the occurrence of menstruation; this important duty is left to governesses, schoolmistresses and servants. Hence, not seldom does it happen that a girl is brought for advice for some anæmic or chlorotic state, and the irregularity of menstruation associated with it has passed unnoticed and unchecked. It is necessary, in such instances, that we should insist on a careful watch being kept on the periods and the character of the discharge. If there be suffering with the period, we must learn the time when the pain is most severe; if it precede the flow, and disappear or continue during its occurrence; if there be

* See chapter on Disorders of Menstruation.

nervous disturbances, headaches, symptoms of cerebral congestion or hysterical tendencies. Tinnitus aurium or visual aberrations may guide us to an ophthalmoscopic examination, and the discovery of arterial tension, optic neuritis, and general hyperæmia of the retina. These in their turn will suggest a urinary examination, and possibly the detection of some latent renal disorder. It will be important to date accurately the commencement of any irregularities, whether in diminution or excess; also, if there be menorrhagia, to know whether any slight discharge continues in the intervals between the periods, and its quantity. If the patient have been regular and has ceased to be so, we look for some cause for the first irregularity, as indiscretion in exercise, in dress, in bathing, perhaps mental shock or emotion, or climate, or period of life.

Discharges.—I shall have occasion more fully to refer to the diagnostic importance of uterine and vaginal discharges in another chapter. I may here briefly allude to the character of the discharge. It may be in nature mucoid, purulent, muco-purulent, sebaceous, sanguineous; it is described as creamy, flaky, thick and viscid, gelatinous, transparent, and acid; in colour, grayish, white, yellow, or brown; at times it is tinged with blood, or it may be of an olive-colour; it may have a heavy odour or be extremely fœtid, or, on the other hand, be odourless. All these qualities indicate, more or less, the source and nature of the discharge. Our opinion is fortified or verified by a microscopic examination, when the presence of pus and the kind of epithelium, whether squamous or columnar, can be determined.

Appliances necessary for Diagnosis.—It is necessary to refer to the objects gained by the use of the appliances already alluded to as required in a careful diagnosis.

Bed or Couch.—In order to make a correct diagnosis we have to proceed as follows: The patient is either in bed or on a couch. For all gynæcological examinations in the study I prefer a couch. That of Goodell ('Lessons in Gynæcology') I have found to answer admirably in hospital practice. It has,

as all good examining couches should have, a dip of 3 inches at the head, so as to raise the hips; and by means of a lever handle the upholstered lid of the table can also be given a lateral dip so as to throw the abdomen forwards, a side-board supporting the body. Foot-rests are added for the feet, and one padded for the left ankle to rest on. When examining, in Sims' position, on this couch, we may readily, with the duck-bill speculum and finger, expose the uterus for demonstration.* For private practice a light couch (see Fig. 29) can be constructed, with a drawer at the end for appliances and small shelf to draw out for resting instruments on. It should be conveniently high for the woman to get on to without any difficulty, and for the operator to sit at the side of to conduct any necessary manipulations. A light rug or wrap should be at hand to cover the extremities, and the majority of examinations can be conducted with little, if any, exposure of the patient. The couch should have an incline from the foot to the shoulders of about 4 or 5 inches, and the top can be sloped upwards to nearly the same level as the foot. It is a good plan to have a small table, made the same height as the couch, opposite the operator's chair, and another chair at the left-hand side at its head, on which a friend can sit, facing towards the patient's feet, over which a light counterpane is thrown. She can thus be cheered and encouraged, while her delicacy is not hurt. It is wonderful how a little gentleness and consideration, with a due regard to a woman's feelings, especially in unmarried girls, will enable us to conduct an examination which any roughness or rudeness would make impossible. We can place a woman on her left side, on her back, or in the semi-prone position of Marion Sims. It is impossible to get the last-named posture properly in any ordinary bed. Yet it is undoubtedly the most advantageous in many instances, and indispensable in several manipulations of the uterus. For the great majority of first examinations, and where we do not

* Sims' obstetric chair can be had of any instrument maker. It can be readily converted into a couch.

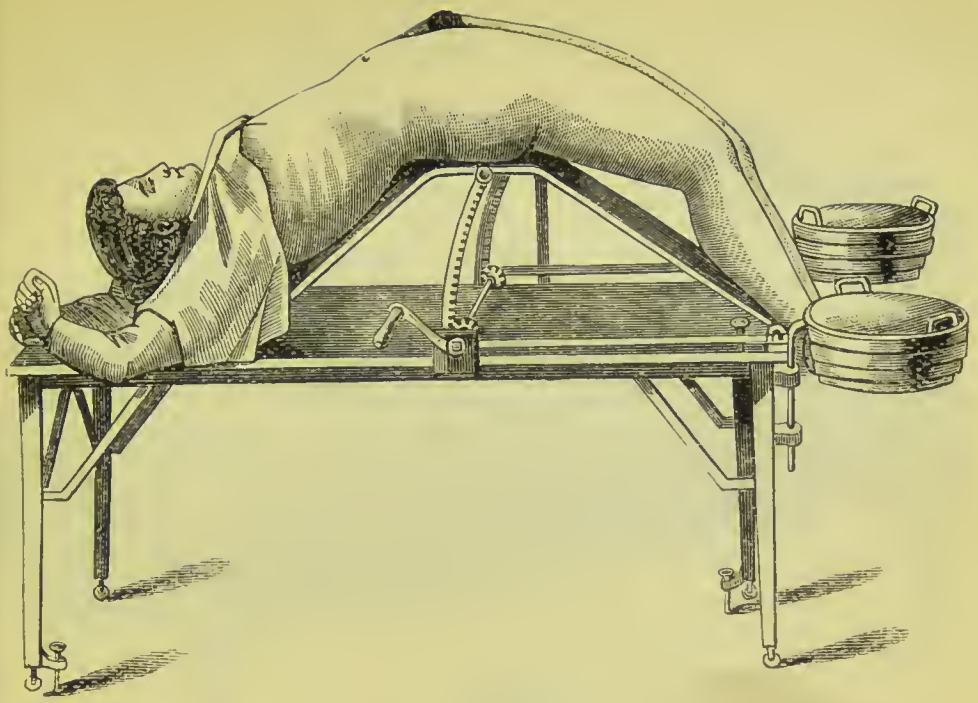


FIG. 27.—Czempin's Operating Table. Czempin states that by resort to this position the light falls more directly into the pelvic cavity in laparotomy than in that of Trendelenburg.

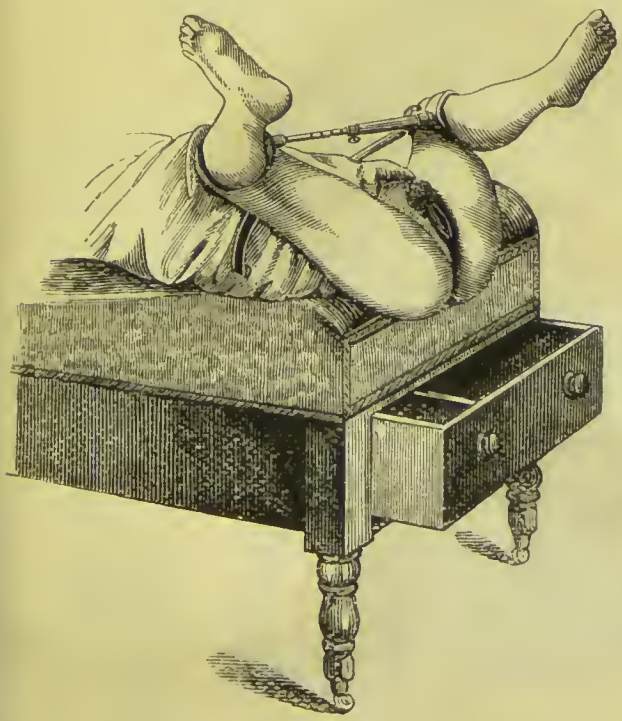
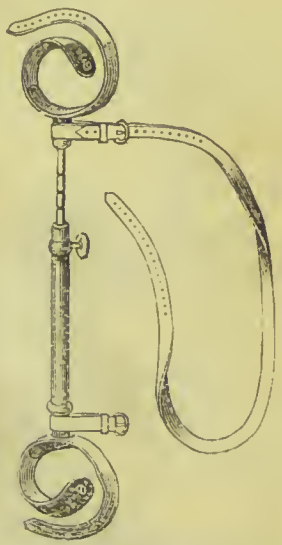


FIG. 28.—Showing patient in dorso-sacral position under anæsthetic for minor operations (after Pozzi).



Crutch of Von Ott (St. Petersburg); the long strap fixes patient to the couch or table.

Illustrations of Clover's Crutch and Howard Kelly's Leg Support, and that of Dowd (combination of Jacket and Leg Support), appear in the description of the operation for vaginal prolapse.

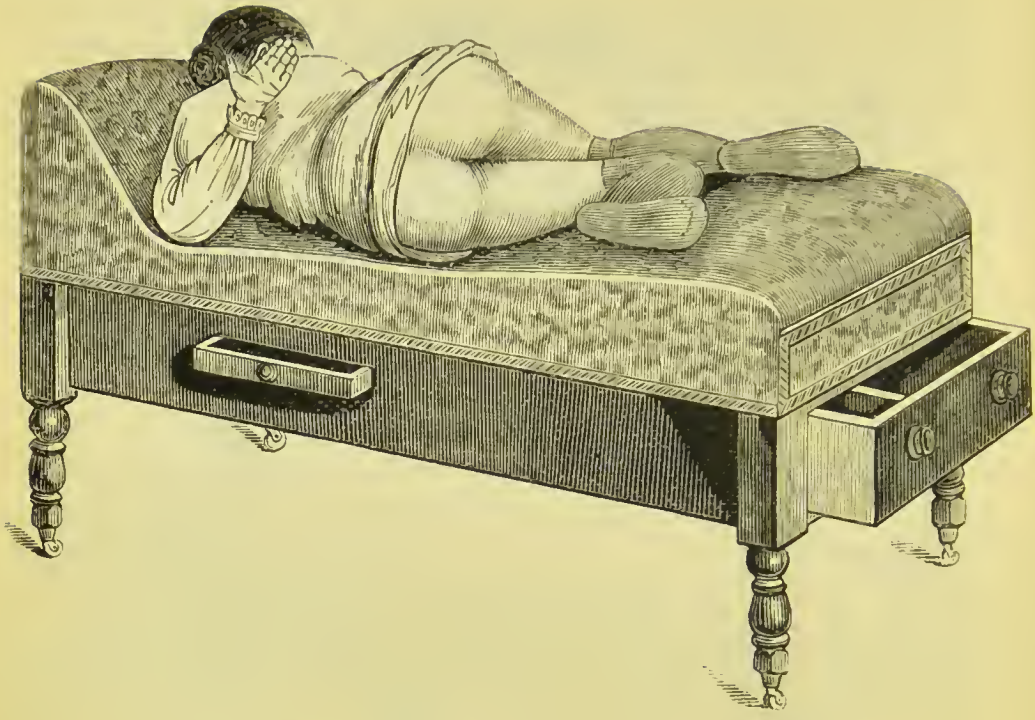


FIG. 29.—Ordinary study couch.

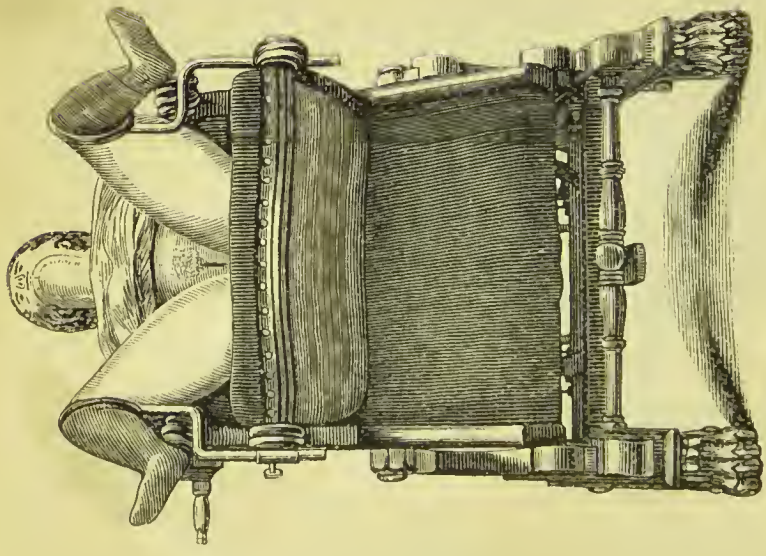


FIG. 30.—Patient raised and placed in the dorsal position for examination on convenient chair for study use, which can be fitted with screw and socket for adjustable leg-rests. By means of the removable handle (*a*) the patient can be raised to the desired height, and by pressure of the foot on the pedal at *b* she can be placed at any angle. This is simply the older dental chair adapted for gynæcological purposes. It also can be used as a convenient armchair.

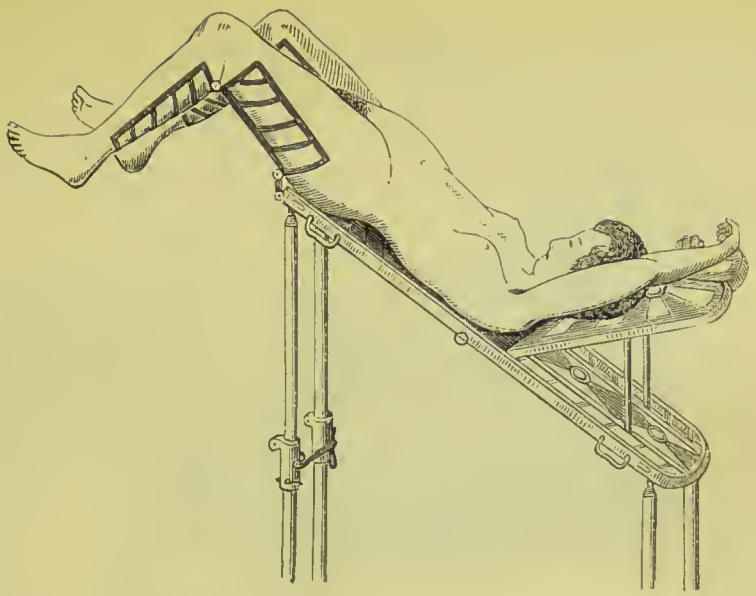


FIG. 31.—Trendelenburg's position for the better view and manipulation of the pelvic viscera in operations on the uterus and annexa.*

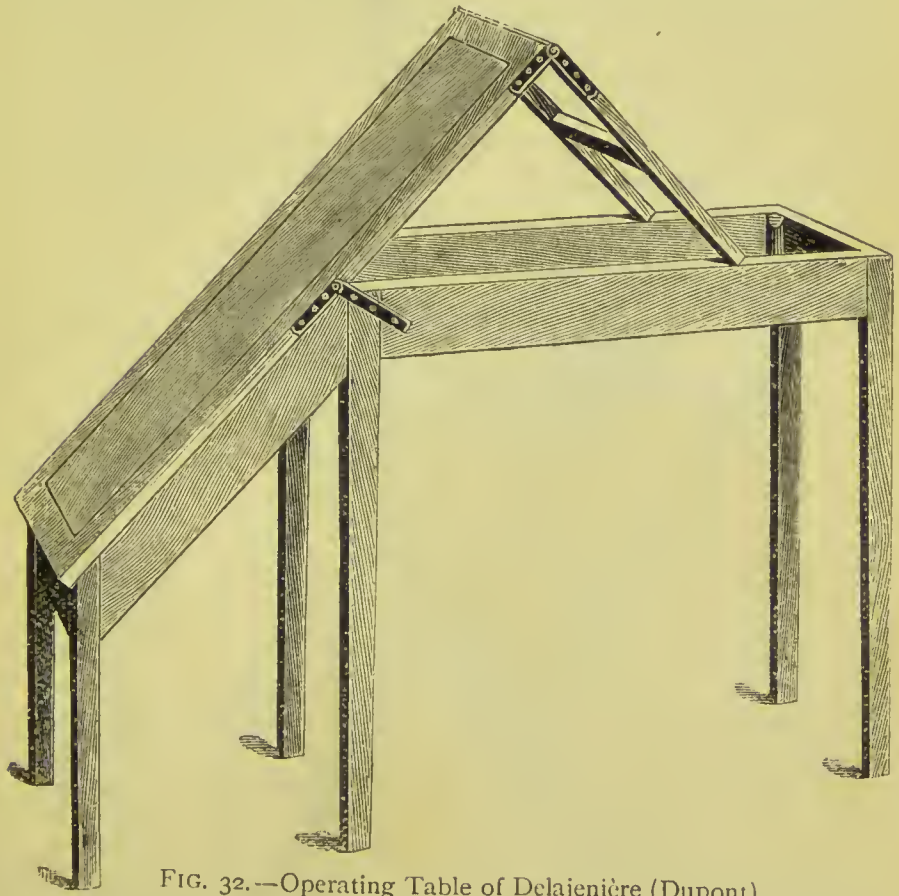


FIG. 32.—Operating Table of Delajenière (Dupont).

See chapter on Surgical Treatment of Uterine Fibromata for Greig Smith' operating table.

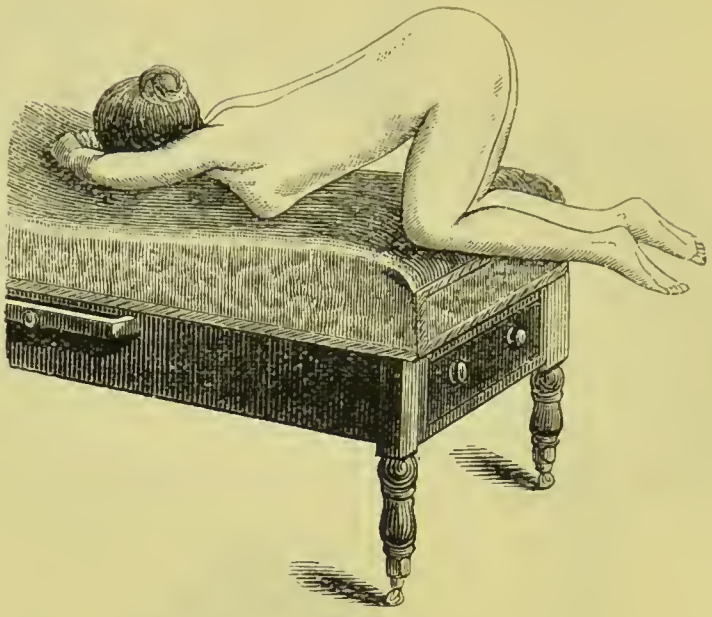


FIG. 33.—Position of the body in the genu-pectoral position ; the thighs should be separated more than is shown in the drawing.

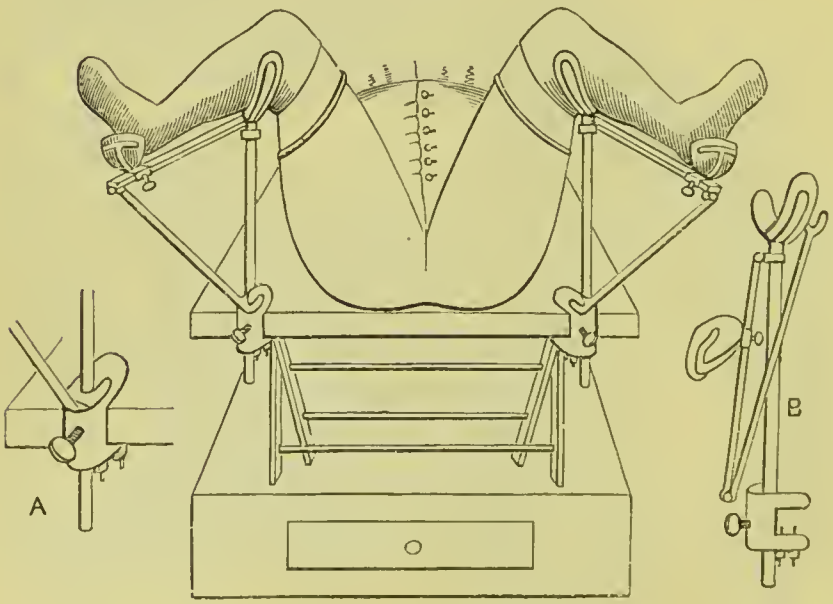


FIG. 34.—Crutch and Leg-rest, with Couch of Alexander ; useful in perinæal and similar operations.

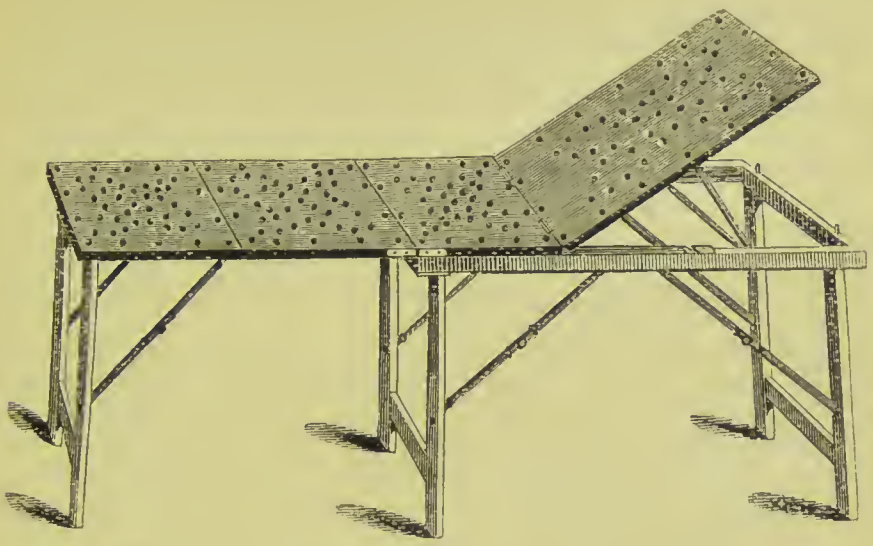


FIG. 35.—Jessett's portable and folding Operating Table, answers all the purposes of Doléris'.

FIG. 36.—Portable and folding Table of Doléris, made by Mathieu (Pozzi).

require manipulative interference, it is sufficient to place the woman on her left side, with her thighs drawn up to the abdomen; and if in bed, the body should be placed diagonally, with the buttocks brought to the edge and the left arm carried behind the back, the face resting on the pillow. It is best to examine on a hard mattress, and, if necessary, a few pillows may be placed under the hips to raise them. The couch or table must be opposite a good light. After a first examination, and when further exploration of the uterus or the use of the tubular speculum is necessary, the dorsal position is by far the best for the operator and the most convenient position for the patient. When we determine to adopt the semi-prone position we do so thus: Any square table about 4 feet by 2 feet 6 inches, having a blanket smoothly spread on it, answers the purpose admirably. The patient lying down on this surface, on her left side, with the body placed diagonally, the buttocks well to the side, has the thighs drawn up; the left arm is next taken, and the back of the left hand is laid on her left scapula. The right hand is now let hang over the side of the couch, while the face is, when possible, partly turned towards the operator. Thus the sternum and chest are brought well on to the plane surface. At times we may not be able to accomplish this, but we thus secure the most favourable depression of the sternum. If, at the same time, the bed or couch be given a dip, as before described, we have the most perfect position in which to examine and conduct short manipulations by means of the duck-bill speculum. An assistant or nurse to hold the speculum steady and in position—a little art in itself—is required.* I have only to remind young practitioners how careful they must be in taking every precaution to protect themselves from unjust aspersions, by having always at hand, and, when necessary, present in the study, some female attendant or friend of the patient.

* For ordinary use in examination, Howard Kelly's leg-rest is most convenient. (See chapter on Prolapse of the Vagina for description of it, and Dowd's combination of jacket and leg-support.)

Attendant in Study.—So many serious charges have of late been made against medical men, that I deem it right to emphasize the caution given in the text, so as to put it out of the power of any designing or hysterical woman to bring a charge of criminal assault against a practitioner by his taking such precautions as will make this impossible. Also, in those equally serious cases in which women, often those of the better classes, come for the purpose of securing abortion, the medical man cannot be too cautious. Women are apt to be most importunate and pertinacious in their endeavours to effect this purpose. A medical man may be made the victim of a plot to throw the blame off the shoulders of another. A woman may wilfully deceive him as to the occurrence of the catamenia or of hæmorrhage, and the impossibility of conception. A false charge of effecting criminal abortion may be trumped up, and if the practitioner be not wary and determined, appearances and circumstances may be urged against him that he could never have anticipated. Circumspection and caution to a degree that may seem almost unnecessary are demanded in order to defeat either hysterical delusion or deliberate intrigue. The obligations of professional honour and fair play impose on all practitioners the need for the greatest care and reticence in listening to any such stories, when whispered of a brother professional. It is to be regretted that many such unfortunate cases would not occur but for the too ready ear of some medical man, who, either designedly or through incaution, has countenanced a groundless suspicion, or favoured a charge absolutely ruinous to the character of him against whom it is made. Such precautions are all the more necessary in these days, when women generally are so conversant with medical matters, and read the details of these cases in the daily press, or gather their information from medical literature, to which they have too free access. *In every case in which the practitioner has the least suspicion as to the object of a woman's visit, or when she makes any illegal request, he should take a note in writing of her name, residence, time of coming to and of leaving his room, the data on which he formed the opinion he gave, the advice that accompanied this opinion, and of any prescription he may have written.*

The Tape-measure is useful for abdominal measurements. We require to take the circumference at the umbilicus, and the lateral measurements from the spinal column to the umbilicus, and from the umbilicus to the anterior superior iliac spine at either side; also from the anterior superior iliac spine to the symphysis. We thus estimate the amount of abdominal distension, and the size of a tumour, or the relative difference and degree of inequality between either side.

The Stethoscope is required for the differential diagnosis of pregnancy from ovarian dropsy, ascites, fibrocyst and fibroid tumours of the uterus, phantom pregnancy, and other causes of abdominal enlargement. The fœtal pulsation and placental souffle should be most carefully listened for. It is also re-

quired for pulsating tumours of the abdomen, in the diagnosis of these from aneurismal enlargement of the vessels.

I have used the phonendoscope very largely in abdominal cases, and can strongly recommend it.

The Speculum is not necessary in a great many cases where our object is to diagnose the character of a tumour, or the nature of some pelvic swelling or uterine enlargement. Rather in those cases in which, obviously, the affection is a uterine or vaginal inflammatory one, acute or chronic, is its use called for. In virgins its employment is to be avoided whenever possible. Never should it be taken in the hand for introduction, in such cases, unless its assistance be indispensable for diagnosis or treatment. It would be impossible to exaggerate the evils that have resulted from the fashionable abuse of this simple instrument.

The impression made on a patient by our first examination may secure her future confidence. Gentleness of manipulation must be cultivated, and especially in the introduction of the speculum. It is best to begin with a smaller-sized conical speculum, such as that of Dr. Hall Davis or Scanzoni. I prefer the speculum with the bevelled rim, as it does not hurt in the same way as those with a sharper edge.* Specula with obturators will be found convenient and easy of introduction. The short bivalve speculum of Barnes is an admirable instrument. It completely exposes the infra-vaginal cervix. Fergusson's glass speculum (Fig. 41), of which we require three or four sizes, is generally made too long. The uterine end should not be sloped at too great an angle. It throws a good light on the os uteri, and is useful for topical applications. It is now made of toughened glass. A fenestrated speculum is not, as a rule, of any special service. The duck-bill speculum (Fig. 39) or Neugebaur's (Fig. 40) variety of it, is used in the semi-prone or lithotomy positions. It is indispensable to the gynæcologist

* White celluloid specula are easily kept clean, and cannot be broken. They must not be placed in too hot water, or the shape may be altered. The disadvantage of these speeula is that the edges are rather sharp, and hurt in introduction.

in manipulations on the os uteri and cervix. In fact, in all cases in which it is possible to employ the duck-bill speculum it is better to do so. Specula must be kept scrupulously clean, not alone for the sake of better illumination, but also to avoid the risk of any contagion in the examination of several cases with the same instrument. If we use one with a bevelled rim, we should see that the groove is thoroughly cleansed. It is well to place all specula in some disinfectant fluid after they have been used, and before they are finally washed with very hot water. To apply a tubular speculum : place the patient on her back, or on her left side, in the position before de-

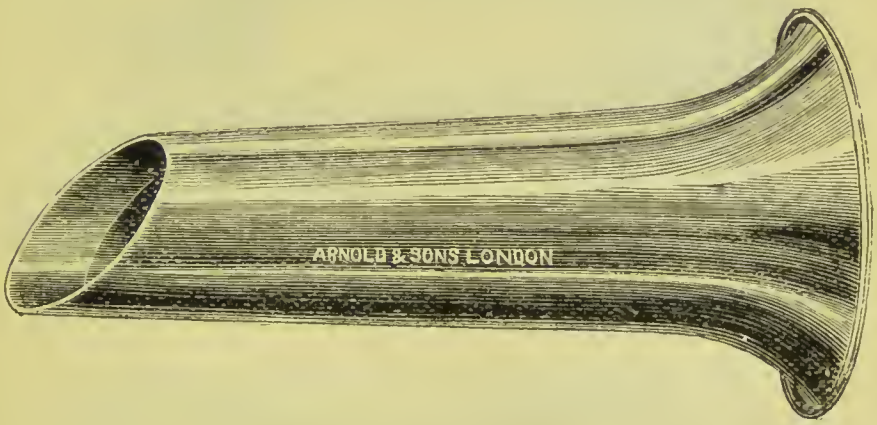


FIG. 37.—Tapering Speculum, with the bevelled end so cushioned internally as to prevent the concealment of any secretion. It is made of light metal, highly polished, by Messrs. Arnold and Sons, for the Author. It can be had in three sizes. It must not taper too much. I have a full-sized *non-tapering* speculum of this kind, made for use in multipara.

scribed. The speculum is first well anointed with oil or vaseline, then taken in the right hand : if the lateral position is chosen, the right buttock is raised with the palm of the left hand, and the fingers of the same hand are used to separate the labia. The speculum, with the long lip posteriorly, is now pressed gently, but steadily, through the vulvar orifice (and here we may cheer the patient and encourage her to bear the slight pain of introduction). It is now pushed onwards, in a direction upwards and backwards, bearing well on the perinæum, until we reach the posterior cul-de-sac of the vagina, and get the cervix well into the instrument. At times this is not easy ;

the uterus may be considerably anteverted or retroverted. A little practice and experience will enable us, with the uterine sound, to direct the os uteri forwards or backwards so as to bring it into sight. By rotating the speculum, withdrawing it a little and reintroducing it, we can generally obtain a complete view of the circumference of the cervix and the os uteri. The line of meeting of the vaginal walls seen through the instrument should be kept in the centre of the surface exposed to view. If we place the woman on her back, we insert the

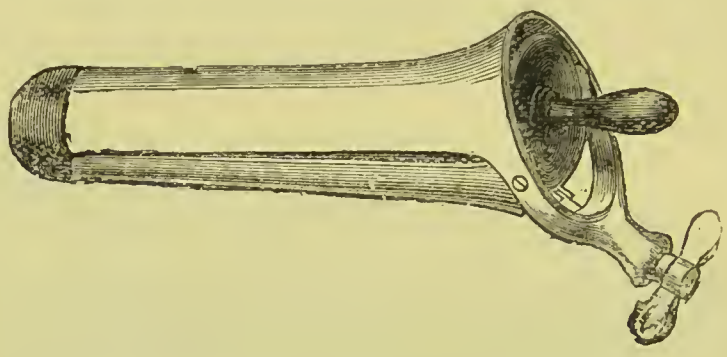


FIG. 38.—Bivalve Speculum of Dr. Robert Barnes.

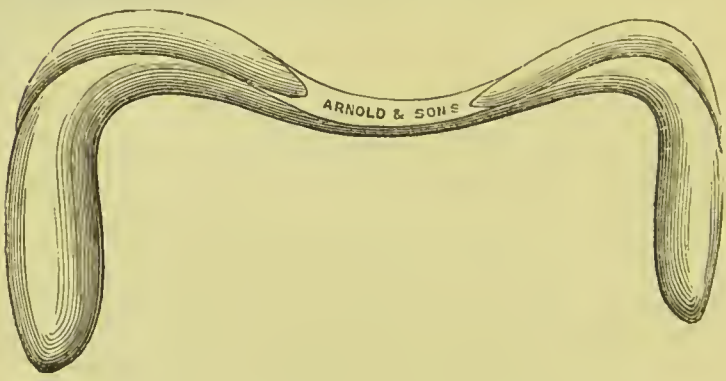


FIG. 39.—Sims' Duck-bill Speculum.*

speculum in the lateral position, and press it well back on the perinæum in passing it into the vagina. In this preferable method the os uteri generally comes into view readily, and the patient can herself often give valuable assistance in supporting

* The blades of the speculum should not be too deeply grooved, nor too long; those ordinarily made frequently are. Every practitioner should have two sizes of the duck-bill speculum.

the speculum, if we happen not to have an assistant. The speculum forceps (Figs. 48, 49) is required with the speculum, and some pledgets of absorbent cotton-wool ready at hand, to

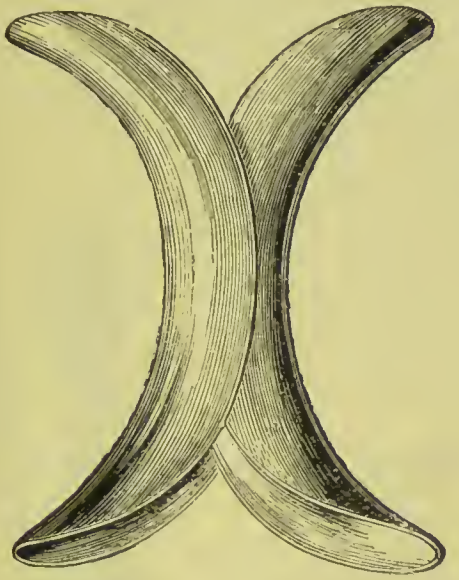


FIG. 40.—Neugebaur's Speculum.

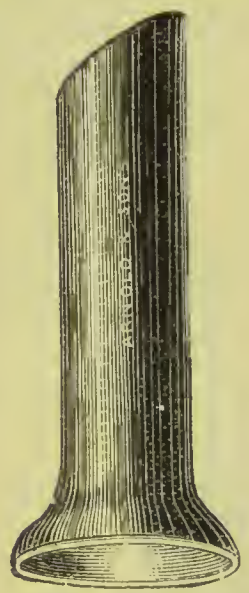


FIG. 41.—Fergusson's Speculum.

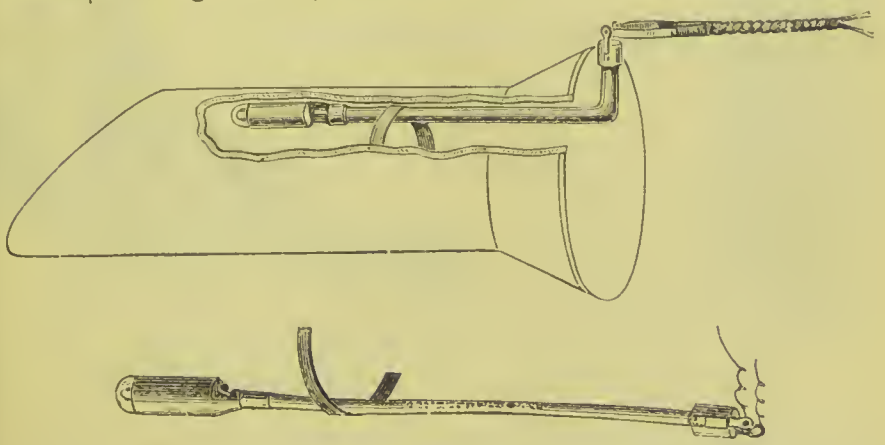


FIG. 42.—Coxeter's Electric-light Speculum.

Speculum with Electric Illumination.—Various specula fitted with the electric light have been devised. Fig. 42 shows one of these. Furst has devised a self-retaining speculum, to which a self-retaining electric light is attached. One of these electric-light specula can be obtained of any medical electrician. This device of Mr. Coxeter is the simplest I know of, and can be adapted to any speculum.

wipe the surface of the os uteri, and to clear the vaginal roof of any discharge that may have accumulated or be pressed out

by the speculum. It is well to have a few uterine cotton-holders (Figs. 97-100) if we require to wipe out from the interior of the cervix any discharge with cotton-wool; also an ordinary sponge-holder (Fig. 46). To use the duck-bill speculum, we place the woman in the semi-prone position of Marion Sims, as I have already described. An assistant, standing at the back of the patient, places the left hand flat on the right

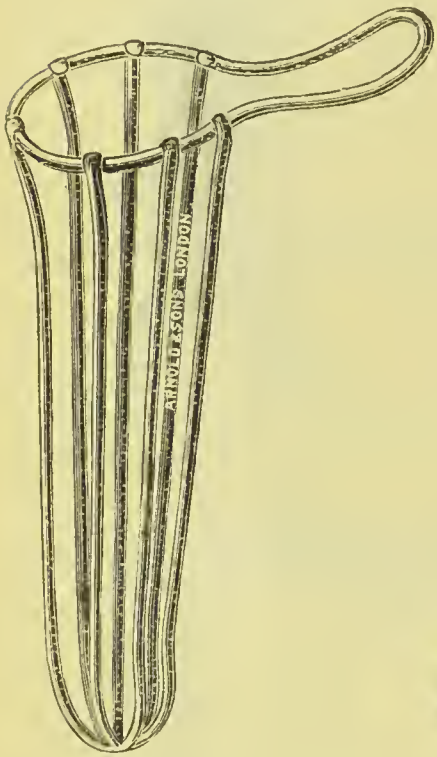


FIG. 43.—Bath Speculum.

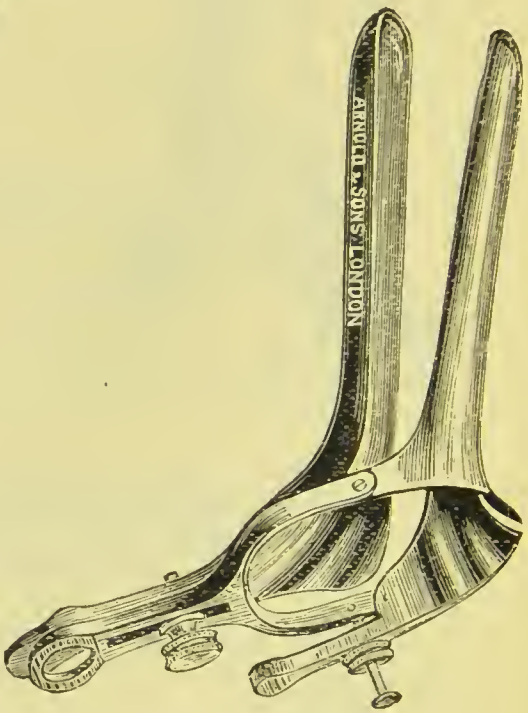


FIG. 44.—Brewer's Bivalve and Duck-bill Speculum combined.

gluteal fold and holds it well up; the blade of the speculum is now introduced in rather an oblique manner to the orifice, the labia being gently separated; and while it is pushed upwards and backwards it is rotated on its axis, and the back of the speculum is brought against the perinæum. It is then carried into position, directed by the finger. In most operative procedures it will be found that more room is obtained, and the uterus is better seen and more readily controlled, in the

lithotomy position. Once the speculum is properly adjusted, and the cervix uteri is brought well in front of the blade, the finger of the right hand, or the handle of the sound, must be carried up to the anterior vaginal wall, which is thus held out of the way. The uterus is generally, by this method, well exposed to view. If we require to bring the uterus down for medication, or to steady it for topical application, we use a Sims' uterine hook, or, what I prefer, a slender double tenaculum forceps. It is fixed in the anterior lip of the uterus, and the os uteri is thus drawn into view. Neugebaur's speculum, a modification of Sims', has, in some instances, the advantage, through its double blade, that it enables the operator to draw up the anterior vaginal wall. When applied, it acts like a

FIG. 45.—Hawkins Ambler's Uterine Dressing Probe, with hollow handle for the insertion of the fluid.*

FIG. 46.—Metal Sponge-holder.

bivalve speculum, and is, to an extent, self-retaining. The posterior blade having been adjusted, the anterior is slipped within it, and is so guided into position. The vaginal roof is thus stretched, and a good view of the uterus is obtained. There are other modifications of Neugebaur's speculum which it is not necessary to refer to.

Demonstrating Vaginal Speculum of the Author.—The desirability of having such a speculum as would enable the surgeon to demonstrate to a student or students the os uteri and infra-vaginal cervix, in a different manner from that now adopted, and without exposure of the patient, often struck me in hospital work. By such an appliance as that shown in Fig. 54,* this can be perfectly achieved. It consists of a nickel-plated steel bracket with three joints, as shown in the figure, which are so constructed as to enable the mirror to be placed at any angle or plane to the orifice of the speculum, from which it is 25 centimetres distant. A clamped ring with a groove receives the mouth of the speculum,

* See p. 59.

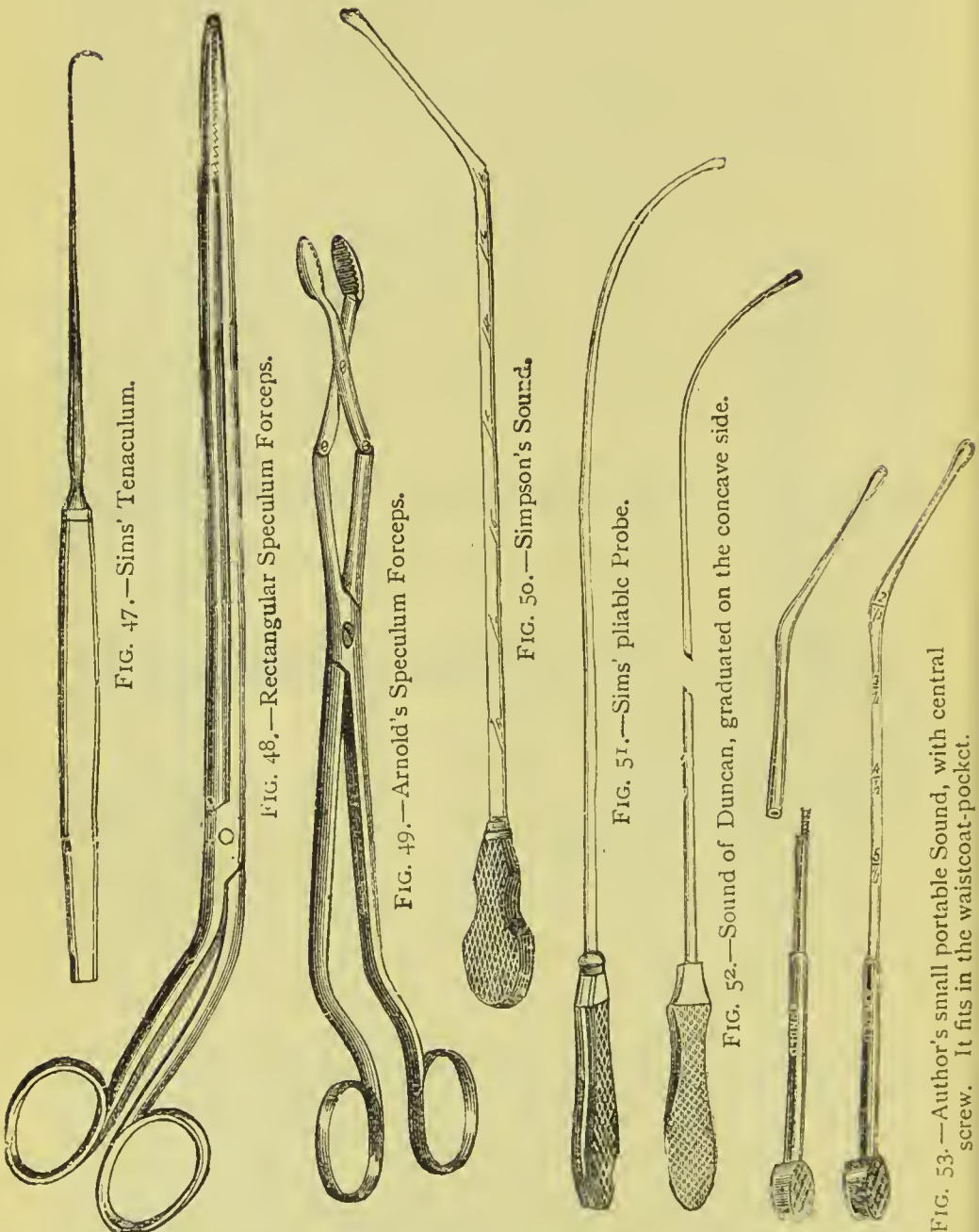


FIG. 47.—Sims' Tenaculum.

FIG. 48.—Rectangular Speculum Forceps.

FIG. 49.—Arnold's Speculum Forceps.

FIG. 50.—Simpson's Sound.

FIG. 51.—Sims' pliable Probe.

FIG. 52.—Sound of Duncan, graduated on the concave side.

FIG. 53.—Author's small portable Sound, with central screw. It fits in the waistcoat-pocket.

The handles of all uterine instruments should be made of metal and smooth.

and will fit one of large size. This may be so arranged that any ring can be applied so as to embrace a smaller speculum. At the other end of the bracket

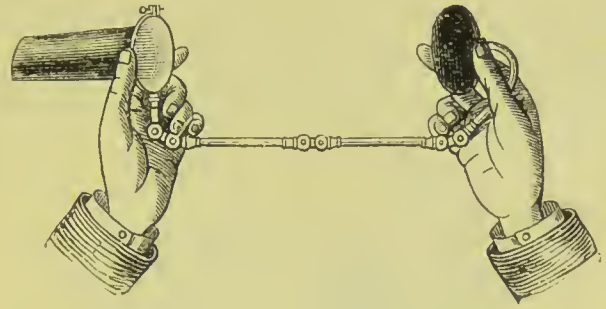


FIG. 54.—Demonstration Speculum of Author.

is a mirror, which works in a universal joint. It is 3 inches in diameter. If it be wished to get a magnified image, a slightly concave mirror can be attached. The entire appliance is shown folded in Fig. 55. It is quite portable.

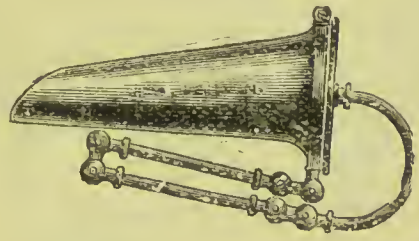


FIG. 55.—Appliance folded (¼-size).

By means of this instrument the lips of the os uteri can be seen, either by sunlight or artificial light, at several feet distance. The patient need not be in the least exposed during the demonstration. The teacher having introduced

FIG. 56.—Olivier's Irrigating Sound; it permits the free exit of fluid.

the speculum, and having caught the reflection of the uterus at the plane required, turns the mirror so that anyone standing behind him or at the side, and looking into it, can see both the os uteri and any application which is made to it. It is not necessary to expose more than the orifice of the speculum.

The Uterine Sound (Figs. 50-53) takes the place of a long obstetric finger. A good uterine sound should be pliable and smooth—such as that of Kidd or Marion Sims, and if graduated

it is better to have the scale on the concave side. Heywood Smith has devised a sound (with curette handle) which folds in two, and combines the purpose of curette and sound. The sound can be made portable for the pocket, either by a screw joint in the centre of the sound, or the upper half of the

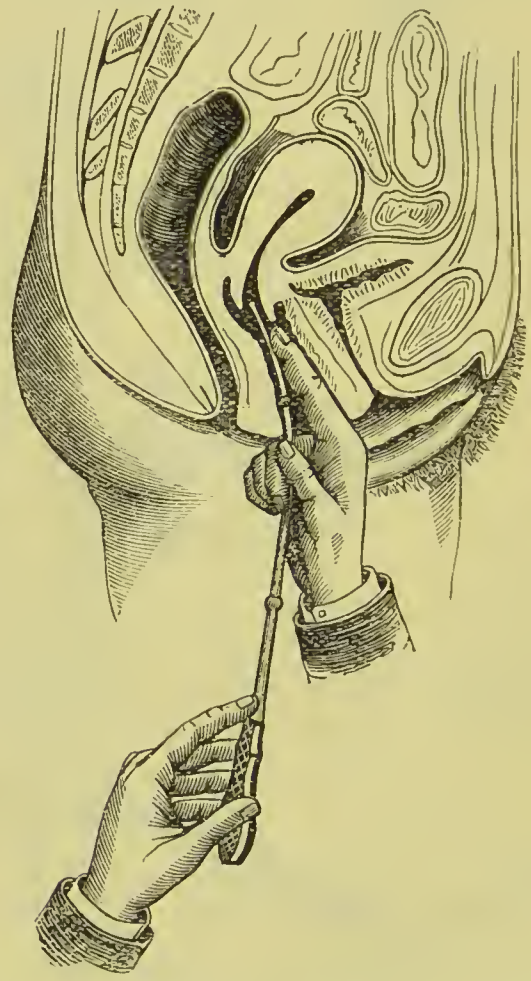


FIG. 57.—First Stage of passing the Sound (Hart and Barbour).

instrument may screw into a case which acts as a handle. It should not be too heavy. The sound can be used both for diagnostic and therapeutical purposes; in diagnosis, to ascertain the length of the uterine cavity and the patency of the canal, the mobility of the uterus and its position in the pelvis; in utero-rectal and recto-vesical examinations, as in the

diagnosis of hæmatocele, polypus, and inversion of the uterus.

The principal therapeutical purpose of the sound is in versions and flexions, to take the place of a repositor. To introduce the sound into the uterus, we proceed thus :

The patient is placed in the lateral or semi-prone position.

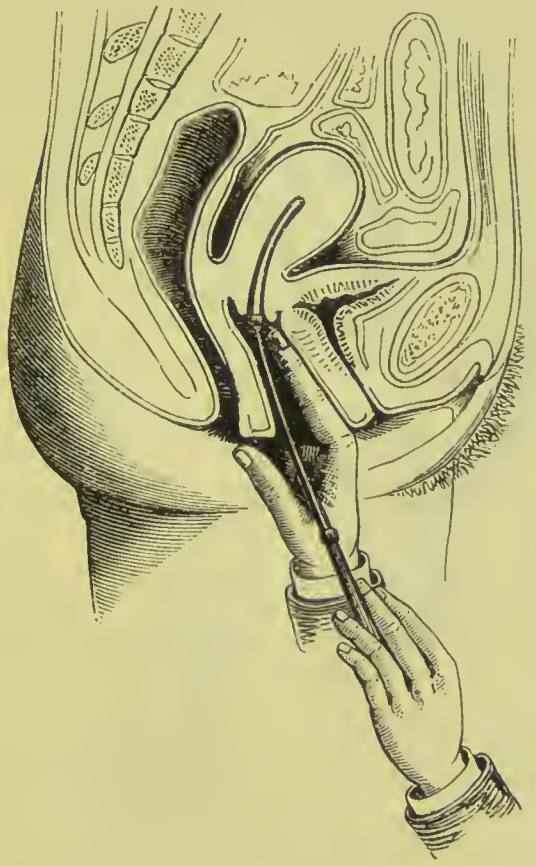


FIG. 58.—Second Stage of passing Sound (Hart and Barbour).

The thighs are well drawn up, while the nates are brought over the edge of the couch. The instrument is taken lightly by the handle in the left hand, while the point of the forefinger of the right hand is carried up to the os uteri, which is felt, and its direction and the position of the uterus fairly ascertained. The sound is now introduced into the vagina, with the concavity towards the perinæum and the handle directed backwards ; it

is next guided along the index-finger of the right hand to the os uteri. As a rule, with some little manipulation it enters the cavity of the cervix; it is then carried along the cervical canal, and now the handle is turned in the operator's hand, and by a *tour de maître* is brought round with a gentle sweep, until it is directed towards the perinæum, so as to have the concavity

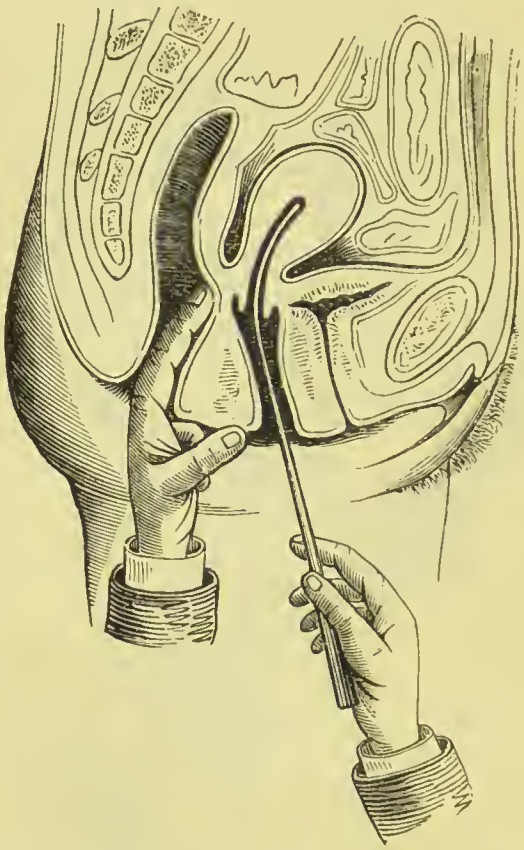


FIG. 59.—Sound in Utero; Recto-uterine examination.

now facing anteriorly, and thus the instrument is directed into the uterine axis in its normal and slightly anteverted position. It is now carried onwards, passing over the forefinger of the right hand still held in position until it reaches the fundus uteri. This we judge it to have done by the slight sense of resistance we feel to the onward passage. We should not make the woman's sense of pain a test. In certain softened states of the

uterine tissues it would be possible to penetrate the uterine wall and still cause very little pain. It is right to say that only in exceptional cases is the sound required for diagnostic purposes. The educated finger tells us generally all we require, and by this bimanual method of examination we can fairly estimate the size, position, and degree of mobility of the uterus.

The usual difficulties experienced in passing the sound are caused by contraction, or stenosis of the canal of the isthmus

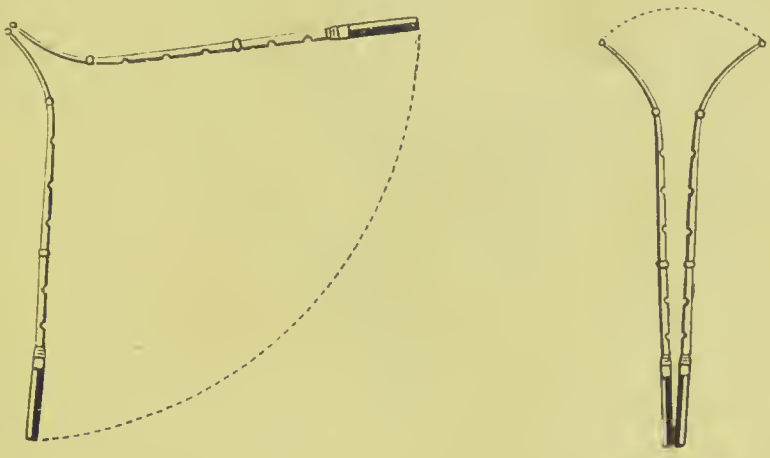


Fig. 60.—Proper Method of Rotation of the Sound, as compared with the improper (Hart and Barbour).

uteri, or flexions, or versions. There may be such a degree of narrowing that it is impossible to pass the instrument, or we may only succeed with the pliable silver uterine *probe* of Sims. In versions we must carry the handle well back to the perinæum, or forwards to the pubes, according as we have an anteversion or a retroversion to deal with ; if there be also a flexion, we may have to bend the sound, and endeavour, by giving it the necessary curve, to glide it over the bend. We pass the sound into the bladder in recto-vesical and urethro-vaginal methods of examination. We must always remember the *sine quâ non* of obstetric practice—that *before taking the uterine sound into our hand for any therapeutical or diagnostic*

*purposes, we exclude the possibility of pregnancy.** Also it is well, after all tedious examinations with the uterine sound, if these be made at the operator's house, to take every precaution against cold ; and the simplest plan to prevent this is to place a dry plug of absorbent wool in the vagina, to be withdrawn by the patient herself after a few hours. In this, as in a number of other trifling uterine operations, the immunity from all harm that may have followed us for years may be suddenly and unpleasantly interrupted when we least expect it —the attack of uterine colic or of endometritis, or perimetritis, is suddenly developed, and alarming symptoms may occur, that a little prudent forethought would prevent. Take, for example, the neglect of the sound maxim, to refrain from interference immediately before a menstrual period is approaching.

By keeping the forefinger of the right hand at the os uteri, and placing its tip on the concave surface of the sound when it has penetrated to its full extent, we can estimate, by the graduated grooves, the exact length of the uterine canal. Before removing it we can test the mobility of the uterus, raise it, or replace it in position ; and also judge comparatively, by utero-rectal, utero-abdominal, and utero-vaginal examination, of any abnormal connection of the uterus with some neighbouring viscus, or attachments that have formed between it and other morbid pelvic and abdominal formations and growths. In introducing the sound it may be caught and arrested by some fold of mucous membrane, or the knob (which should always be of fair size) may enter a small follicular cul-de-sac. By partly withdrawing, and gently passing it on again, we pass over the obstruction. Again, at the isthmus we may find its passage impeded. One golden rule must be observed—never use force. Better to withdraw the knob of the sound from the uterus, and with the finger in the vagina give the point of the sound a new curve, bending it a little more forwards or backwards, or laterally, and again try to slip it into the cavity of the fundus. Frequently, in severe

* See remarks on the *differential diagnosis of pregnancy*.

cases of anteflexion or retroflexion, we shall succeed in passing the sound by thus repeatedly altering its shape and changing the direction of the handle, until we hit off that which enables it to pass through the altered curve of the uterine canal. In extreme retroversion we may have to carry the handle

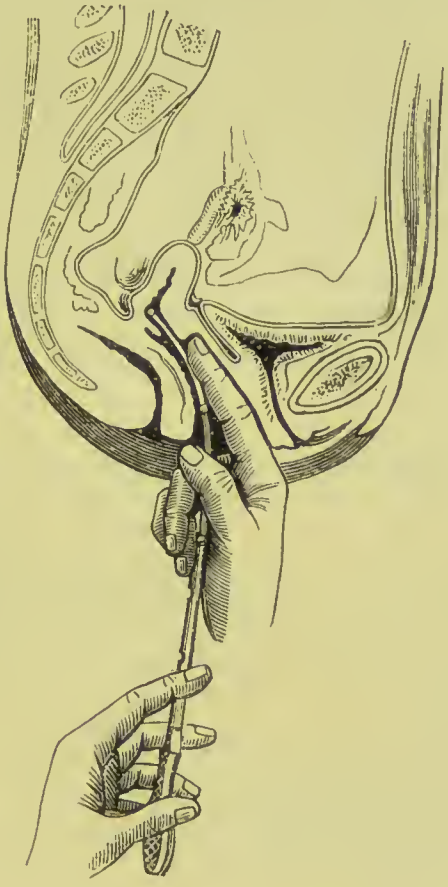


FIG. 61.—Sound arrested before Rotation in case of Anteflexion (Hart and Barbour).

forwards to the pubes, and direct the concavity backwards ;* we next feel for the os uteri, and pass the sound onwards, giving the handle such elevation or dip as will assist the knob to pass on into the cavity. When the elbow is reached, by a semicircular sweep, we revolve the sound on its axis and thus alter its direction, while at the same time, by

* See chapter on Retroversion.

lowering the handle, we raise the uterus from its depressed position (Fig. 61).

The Urine.—An examination of the urine is often required, and, indeed, few cases of any complicated local affection can be viewed satisfactorily, either from a diagnostic or prognostic aspect, unless a urinary examination be made.

In Oliver's test-papers we have very delicate tests for albumen ; and the examination may be carried out at the bed-side, all we require being a small test-tube. I have found the potassio-mercuric-iodide the most delicate of these papers, detecting albumen where heat and nitric acid have failed. The indigo-carmine papers are equally reliable for sugar.

This table of comparative analyses of male and female urine by Becquerel may be useful as a guide in judging of abnormal urine :

Comparative Analyses of Male and Female Urine (Becquerel).

	Mean Composition of Four Healthy Men.	Mean Composition of Four Healthy Women.	General Mean.
Specific gravity - - - -	1018·9	1015·12	1017
Percentage of water - - -	96·88	97·50	97·19
,, ,, solids - - -	3·11	2·49	2·80
,, ,, urea - - -	1·38	1·03	1·21
,, ,, uric acid - - -	·039	·040	·039
,, ,, other organic matter	·92	·80	·86
,, ,, chlorine (combined, fixed) - - -	—	—	·05
,, ,, phosphoric acid -	—	—	·03
,, ,, potash - - -	—	—	·13
,, ,, soda, lime and magnesia - - -	—	—	·39

We proceed in practice thus—

Take a specimen of the urine. Find its specific gravity at 60°, reaction with litmus, and the quantity passed in the 24 hours.

Albumen—sp. gr. 1006 to 1010. Test by Oliver's potassio-mercuric-iodide papers (I find it necessary, in order to avoid error, always to apply heat after a precipitate is

obtained with Oliver's paper); heat 180°, and nitric acid a few drops—precipitate; Pavy's citric acid and ferrocyanide pellet. Heller's test—small quantity of urine and cold nitric acid allowed to run down the side of the test-tube.

Phosphates—sp. gr. increased slightly; heat 180°, precipitate obtained, which nitric acid dissolves; phosphatic crystals under microscope.

Urates and uric acid—sp. gr. 1025 to 1030; heat dissolves; hexagonal or rhomboidal crystals of urea, with nitric acid; also uric acid crystals under microscope.

Sugar—sp. gr. 1030 to 1050. Johnson's picric acid test; indigo-carmine test of Oliver; Trommer's and Fehling's tests; Pavy's pellets afford a ready, convenient, and reliable test for sugar (directions accompany).

Pus—Coagulates with heat; deposit forms homogeneous layer at bottom of glass; becomes gelatinous with liquor potassæ; mixes with the urine; pus corpuscles under microscope.

Mucus—Deposit often glairy, tenacious; urine generally alkaline; is not miscible with urine; rendered less dense by liquor potassæ; acetic acid gives a sort of membrane floating in the urine.

Blood—Discoloration with heat; formation of coagulum; blood corpuscles under microscope. Almen's test—freshly prepared tincture of guaiacum and ozonized ether—blue colour.

Clinical Thermometer.—It may seem superfluous to refer to the value of an accurate record of temperature in arriving at a diagnosis, and conducting the management of a case. The importance of such a record is made more obvious if we reflect for a moment on the causes of nightly exacerbations of temperature, or a daily elevation of a few degrees above the normal standard. In peritonitis, perimetric and parametric effusions, hæmatocele, metritis, suppurating cysts, acute vaginitis; in chronic peritonitis; in uræmic and septicæmic states, and cystitis, we may expect the characteristic rise and

fall in the temperature range. In pelvic effusion, especially if pus be forming, the nightly exacerbation is the rule.

With the previous history of a case, an accurately kept chart of the temperature will materially assist a physician in forming a correct diagnosis.

An Anæsthetic is absolutely necessary in cases of rectal exploration, or when we require thoroughly to relax the abdominal wall; in examination of a case in which there is a suspicion of phantom pregnancy, and in those cases in which, as in young girls, there is great sensitiveness of the parts, rendering an examination without it extremely difficult, if not impossible. All the usual precautions to be observed with regard to anæsthetics should be taken. For this particular purpose I consider chloramyl (chloroform with ♏ ii. of nitrite of amyl to the drachm) a capital anæsthetic. It should be administered with a Junker's apparatus. I have been using this inhaler for years. Air is pumped through the anæsthetic by the bellows, and the vapour is thus carried to the mouthpiece.

For ordinary surgical operations I prefer nitrous oxide gas and ether—given with Clover's apparatus. The choice of an anæsthetic should properly lie with the operator. He has the main responsibility in the conduct of the case, and presumably is the best judge of the nature of the anæsthetic suited for the character of the operation, its duration, and the consequences of the after-effects.

The A.C.E. mixture—alcohol, sp. gr. ·838, 1 pt.; chloroform, sp. gr. 1·497, 2 pts.; ether, sp. gr. ·735, 3 pts.—may be given in a Clover's inhaler or cone. I do not personally care for this combination. I much prefer the pure vapour as more certain and equable. The administration of oxygen gas in certain prolonged cases is, I consider, a great addition to the practice of anæsthetization (Buxton).

Dudley Buxton has kindly supplied me with this note on the use of oxygen:

'*Oxygen in Anæsthesia.*—The uses of oxygen in anæsthesia are prophylactic and restorative. It prevents the onset of various undesirable complications,

and presents one of the most powerful agents we possess to counteract grave respiratory dangers under anæsthetics. Paul Bert suggested a mixture of oxygen and nitrous oxide, but as he found it unsatisfactory when given under normal pressure, he adopted the practice of exhibiting this combination of gases under increased pressure.* The method, although successful, fell into desuetude owing to the cumbersome apparatus required. More recently Klikowitsch and Hillischer, of Vienna, have shown that a most satisfactory anæsthesia can be obtained at normal pressure with a mixture of from 10 to 15 per cent. of oxygen and nitrous oxide. Hewitt, in this country, has devised a satisfactory apparatus, and has confirmed Hillischer's views on the value of his so-called "schlafgas." The combination has in my hands proved most valuable for delicate children, anæmic persons, and those in whom shutting off the oxygen-supply leads rapidly to cyanosis and pulmonary engorgement. Carter Cole† has suggested the use of a special apparatus for giving ether with oxygen, and publishes a series of satisfactory cases. I have, however, without the use of any special inhaler other than my form of Clover's gas and ether apparatus, employed this method with the greatest success. By this means many cases, which would have been most difficult or impossible for the use of ether, have been anæsthetized without let or hindrance. Oxygen employed with chloroform to lessen the liability to asphyxia under the anæsthetic has been in use for very many years. Neudörfer, the originator of the method, states that less chloroform is used, and that there are fewer severe after-effects. The plan, although recently written about and claimed as an "invention," is as old as the introduction of chloroform itself. Kreutzmann has used the mixture, allowing the afferent tube of the Junker's inhaler to be connected with a reservoir of oxygen. Personally, I have found oxygen a valuable addition to the chloroformist's armamentarium. In poisoning by chloroform, the performance of tracheotomy or laryngotomy when practicable, and the continuous introduction of a stream of oxygen through a tube inserted into the windpipe, with rapid rhythmic compression of the lower ribs, succeeds better than any other method I know.'

Some safe rules in the administration of anæsthetics are frequently violated in practice: (1) The operator should not, if possible, be the anæsthetizer; (2) the administrator should not be conversed with during the administration of an anæsthetic; (3) a recent trial has shown how careful the operator and those assisting him should be to make no observation on the case while the patient is in the condition of semi-anæsthesia, either when she is being placed under the anæsthetic or is coming from under its influence.

I am doubtful, after a very large personal experience in the administration of various kinds of anæsthetics, whether, taking the *after* effects of ether into con-

* See 'Anesthésie Chirurgicale,' M. Rollenstein, p. 303.

† *Med. Rec.*, New York, October 12, 1895.

sideration, there is much material advantage in its use over that of chloroform in abdominal surgery. I was one of the first in the United Kingdom who

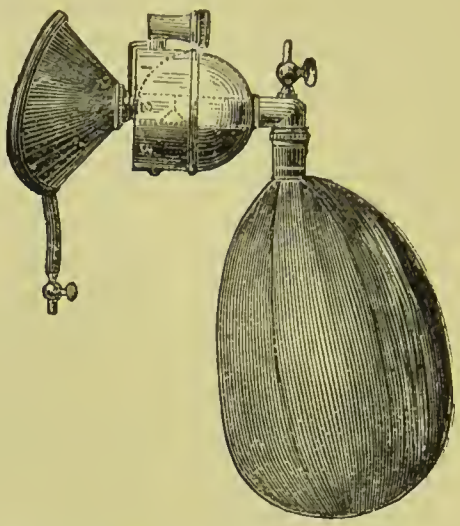


FIG. 62.—Clover's Gas or Ether Inhaler.

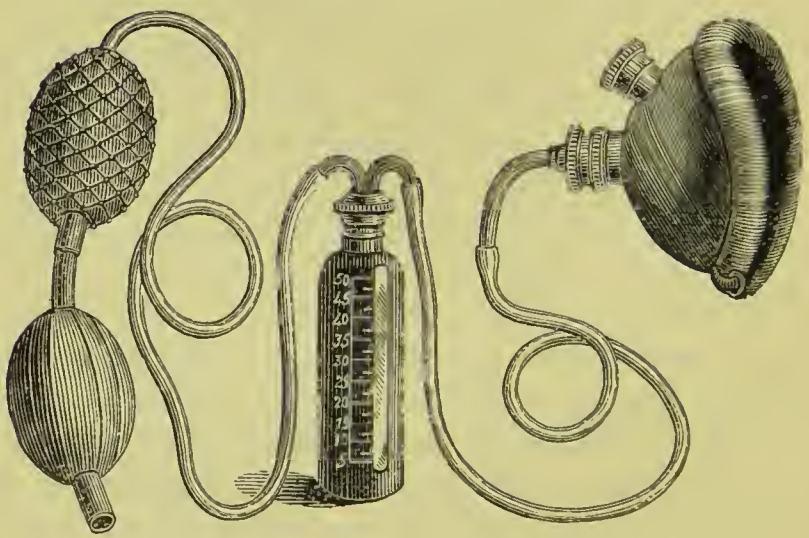


FIG. 63.—Junker's Inhaler.

strongly advocated the employment of ether in general surgery.* At that time I had myself administered methylene some 1,300 times without accident, and chloroform also frequently. Of late years, however, I seldom ask for chloroform, and nearly all my operative work is done with ether.

G. F. Bailey invariably gives nitrous oxide and ether, and prefers it to

* 'Responsibility in the Choice of Anæstheties': Macnaughton Jones, H. K. Lewis, London, 1874; 'Report on Anæstheties,' *Dublin Journal of Medical Science*, 1879.

chloroform. Buxton has applied a foot-bellows to work Junker's apparatus instead of the hand-bellows—this is convenient.

A few precautions must be observed with all anæsthetics. Examine the heart and lungs before using any anæsthetic. Have the patient lying down; the stomach comparatively empty—a little brandy given shortly before administration is often of advantage; let the temperature of the room be over 50°; let the body be free, and all tight clothing loosened; also see that the patient does not wear artificial teeth; watch *the breathing* and the countenance carefully all through the administration; be warned of danger by failure in the pulse, and the signs either of cerebral anæmia in the face, or of asphyxia. At once, if alarming symptoms occur, cease administration, and use restorative measures; raise the patient's jaw, and thus the hyoid bone, by pulling the lower maxilla upwards and forwards, placing the thumbs behind the ramus at either side; the body should be inverted after Nélaton's method; galvanism may be applied along the course of the pneumogastric or over the heart, and sulphuric ether injected subcutaneously.*

Professor Howard, of New York, advocates complete extension of the head and neck, as the best means of raising the epiglottis and hyoid bone. He maintains that this plan is much more efficient than elevation of the jaw; also, he contends that traction of the tongue does not raise the epiglottis. Bringing the head over the edge of the table or bed, so that it may swing quite free, he carries it firmly backwards and downwards, by placing one hand under the chin and the other on the vertex. The utmost possible extension of the head and neck is thus maintained. The skin is to be made quite tense.

I have spoken of the examination of the heart before the administration of an anæsthetic. Of course, it is well known that the most experienced anæsthetizers daily administer anæsthetics, ether, chloroform, and nitrous oxide, without taking this precaution. I do not think that is an example to be followed by the ordinary practitioner, or by anyone whose opinion may not have sufficient weight with an ignorant jury. If the anæsthetizer be a specialist or an authority, and consider such an examination a matter of form or superfluous, in

* *Brit. Med. Jour.*, November 17, 1888.

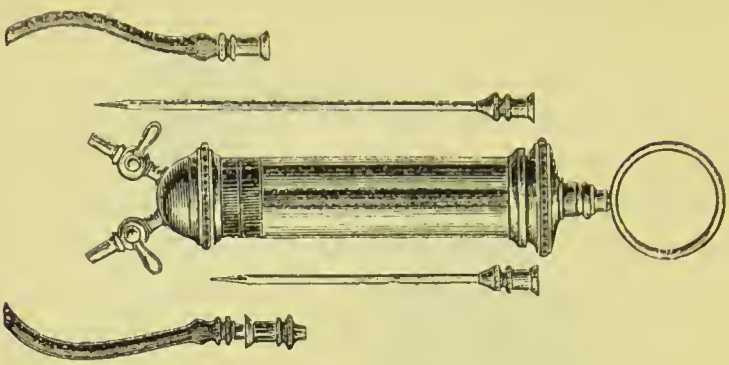


FIG. 64.—Bartlett's Aspirator, most useful in exploration.

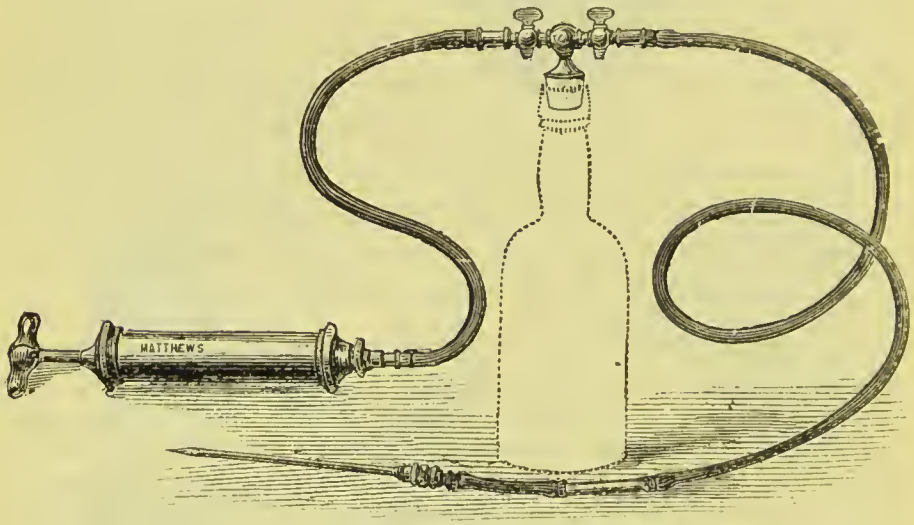


FIG. 65.—Aspirator (Matthews Brothers).

This is a most handy and simple appliance, and, together with the set of guarded needles and obturators furnished with it, answers every purpose.

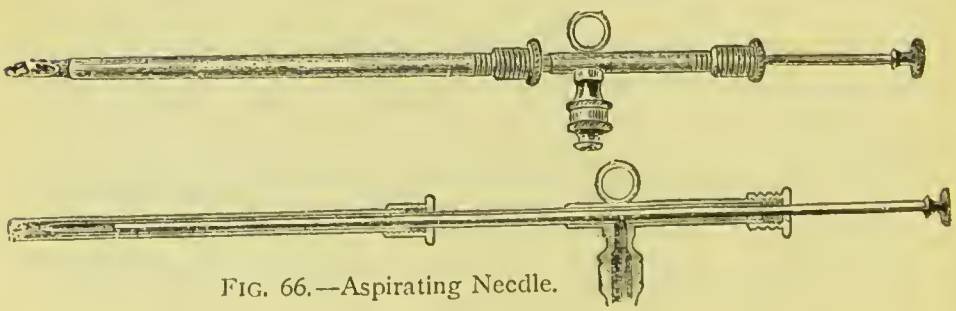


FIG. 66.—Aspirating Needle.

the event of a fatal issue he can better set himself right before a coroner's court than one who has not gained such a reputation.*

Cocaine.—Local anæsthesia of the external genitals and vagina may be effected by the use of cocaine, either in the form of ointment (10-20 per cent.) or solution. The ointment may be freely smeared over the part or applied on a piece of cotton-wool. In the case of a sensitive vulvar orifice, cocaine may be used for the purpose of examination, but this is rarely necessary. It is most useful in all minor operations on the vulva, and may be applied for any painful operation to the external surface of the cervix. I have performed a variety of operations on the vulva, quite painlessly under cocaine, in which the electric cautery was employed. Lanolated lard is the best basis if we use an ointment (lanoline ℥i., lard ℥ss., rosewater ℥ii.).

An Aspirating Needle or subcutaneous syringe is often required to remove a little of the fluid in abdominal and pelvic tumours, to ascertain its nature by chemical and microscopical examination. We may draw the fluid from the point of greatest distension—either vagina, rectum, or abdomen. The small exploring aspirator of Bartlett will be found very useful in the exploration of small cysts, and for purposes of diagnosis.

Tents are employed in certain cases for exploration of the uterine canal, as in cases where we suspect polypus of the uterus, retention of portion of the membranes after abortion, and in menorrhagia, when we are uncertain of the cause of the discharge. Their employment in many operative procedures I shall have occasion frequently to refer to.

Tents used in this country are of three kinds—sponge, sea tangle or laminaria, and tupelo-root (*Nyssa multiflora*). There are certain dangers that may follow from any kind of tent: uterine colic, collapse, metritis, peritonitis, parametritis, tetanus, septicæmia. I have twice seen an alarming condition super-

* I can recommend Dudley Buxton's little handbook on anæsthetics as a most useful work for the practitioner.

vene within three hours after the introduction of a single laminaria tent into the uterus—agonizing pain, symptoms of collapse, fainting, etc. Laminaria tents, if left in too long at first, are apt to break off, and their extraction, save by enlargement of the cervical canal, is a matter of great difficulty. Sponge-tents I rarely use in strictly gynæcological work. I would limit their employment altogether to obstetric cases. Tupelo gives, as far as any tent can, the greatest satisfaction. It is cleaner to use, not so apt to break, is more uniform in its gradual enlargement in the uterus, is easier of removal; its power of absorption is greater, and hence its action is more rapid.

Two special rules should be adhered to in the use of tents.

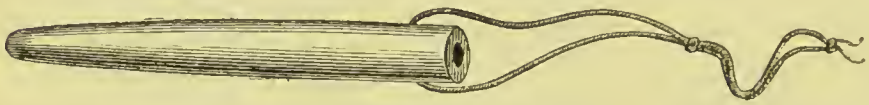


FIG. 67.—Tupelo Tent.

FIG. 68.—Sponge Tent.

FIG. 69.—Laminaria Tent.

Do not insert them *immediately* before a menstrual period, nor leave them in longer than from six to twelve hours (sponge-tents not over six hours), and never for this length of time without visiting the patient. On no pretext leave a patient for a night, or a day, with a tent in utero without being within reach if required. Bromide of ammonium (20-30 grains) or bromide of potassium should be given the night before dilating with a tent. Let the patient lie in bed, and keep her quiet for

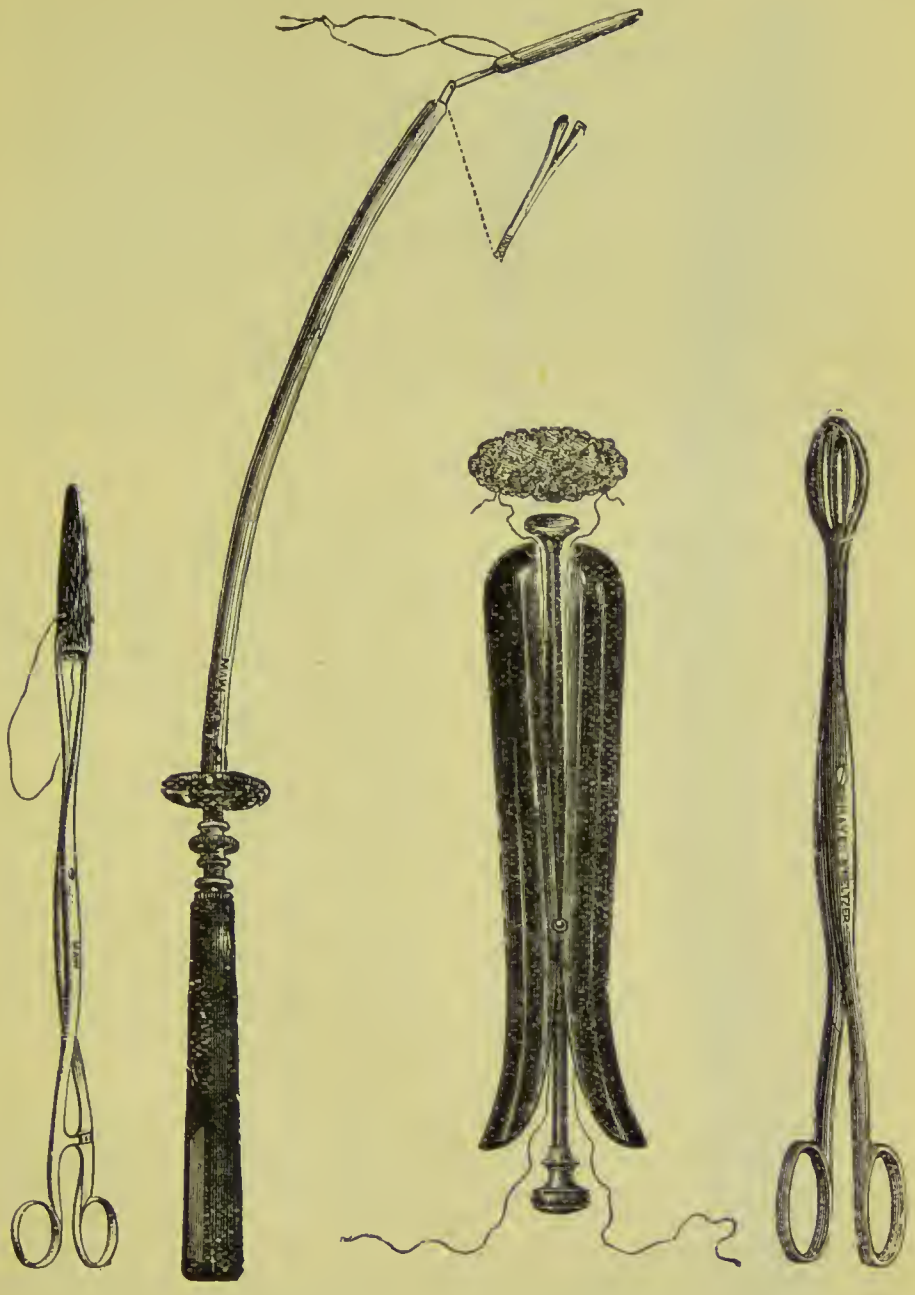


FIG. 70.—Forceps for introducing Tents.

FIG. 71.—Tent Introducer (Arnold).

FIG. 72.—Robert Barnes' Tampon Introducer.

FIG. 73.—Heywood Smith's Ovum Forceps.

a day after the tent has been inserted. Force should not be used in the introduction of tents, and great care be taken *when*

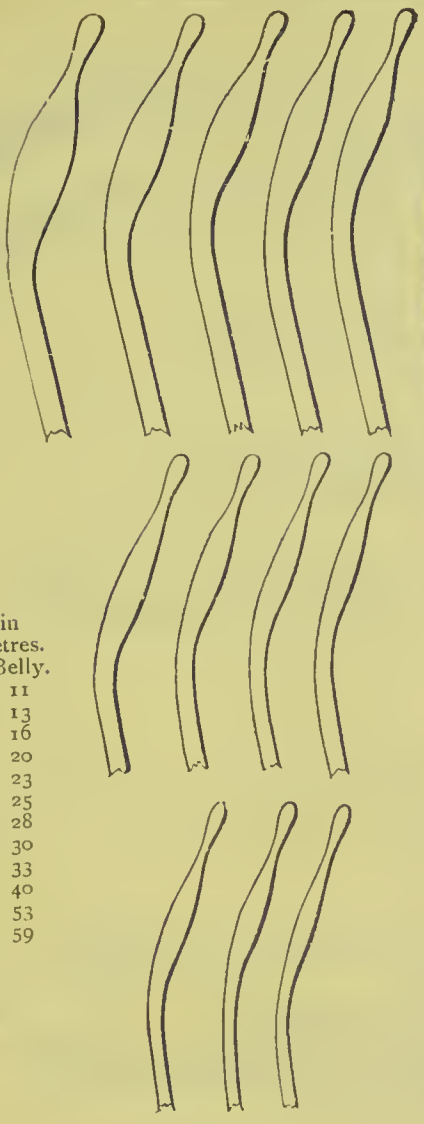
there is any history of recent perimetritis, or in patients prone to peritoneal inflammations. At all times an intelligent attendant should be left with the case after a tent is placed in utero. Anticipate any septic consequences, so far as is possible, by the use of antiseptic precautions—dipping the tent in carbolized glycerine before insertion, and inserting some antiseptic wool into the vagina, or absorbent wool saturated with glycerine and Condy's fluid. The removal of the tent must be followed by free cleansing of the vagina with Condy's fluid or perchloride of mercury solution, and the insertion of an antiseptic pledget into the vagina.

Disinfection of Tents.

I have had very good results with the tupelo tent. Fraipoint uses a saturated solution of iodoform and ether, in which the tents are kept for a few weeks before use, and allows the tent to remain in for twenty-four hours, placing a pad of iodoform gauze against the cervix, when it is introduced.

When applying a tent, we should place the patient in the semi-prone position, and expose the uterus with a Sims' speculum. A tent-introducer may be found convenient. If this be not at hand, the stylet of a catheter, made to protrude by cutting about an inch off the end of the catheter, or a long forceps (Figs. 48, 49), will answer the purpose. If any difficulty be experienced, the uterus had better be drawn well down and fixed with a uterine tenaculum, or Sims' hook.

Dilatation of the Uterus by Tent.—As practitioners still largely employ tents for the purpose of dilatation of the uterus, it may be well to state definitely the precautions to be taken before and during their application. Assuming a case in which dilatation is demanded for exploration of the uterus, or for curettage, carefully-prepared tents of various sizes, and from 3 to 4 inches long, should be ready. The patient is placed in the lateral or dorsal position, and the duck-bill speculum is used. A speculum forceps, the uterine hook, or tenaculum forceps, a 5 per cent. carbolic solution, and some boric wool tampons, should be at hand. The tents may be previously given a slight curve by heating them before a fire or over a lamp flame. When the uterus is exposed, the cervix and entire vagina are well mopped out with a 1 in 5,000 solution of perchloride of mercury. A tent of suitable size is then selected, and the uterus having been steadied, it is pushed without any force through the isthmus into the uterine



Size in millimetres. Bulb.	Belly.
8	11
10	13
12	16
13	20
13	23
14	25
14	28
15	30
18	33
20	40
25	53
29	59

FIG. 74.—Author's Uterine Bougies ; nearly two-thirds size.*

FIG. 75.—A Hegar's Dilator.

* These bougies are now made with a bayonet-joint instead of the screw. *The best plan is to have a shorter bougie and no point.* It is of importance that the bulb and belly should be proportionate in size. The sizes should be marked on the bougies or indicated on the partitions of the case in which they are sent.

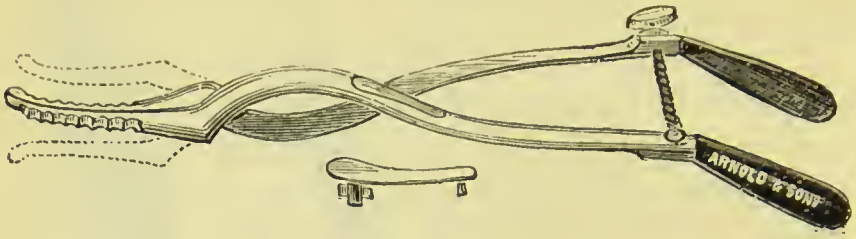


FIG. 76.—Wathan's Uterine Dilator.

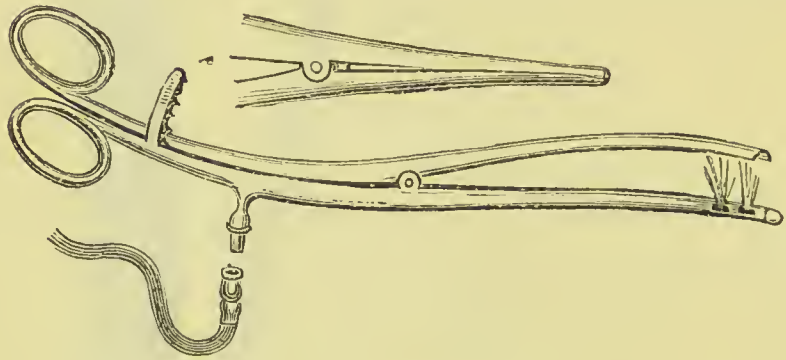


FIG. 77.—Reverdin's Dilator.

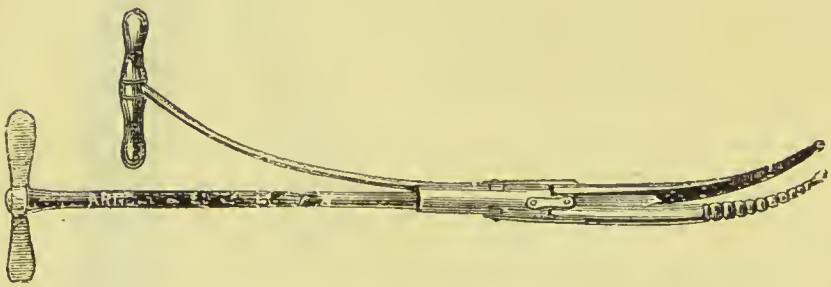


FIG. 78.—Alexander Duke's Dilator.

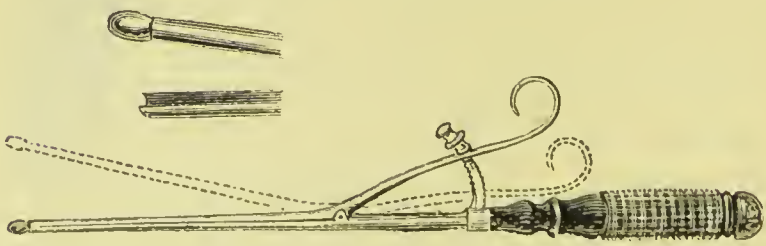


FIG. 79.—More Madden's Dilator.

cavity. Sometimes two fine tents may be introduced at the first application ; but it is generally preferable only to insert a single tent, which readily passes, on this occasion. The vagina is then loosely tamponed, and the patient put to bed. A bromide mixture is given at intervals. When possible, this step should be carried out in the morning, and the tent removed after an interval of from six to eight hours. In order to do this, the patient is again placed in position, and by the aid of the duck-bill speculum the wool and tent are withdrawn. The vagina is now thoroughly cleansed with the perchloride solution, and the uterine cavity is mopped clean with the same by means of a wool-holder. A larger-sized tent, or two smaller ones, is now passed, and the patient is left for the night. As a rule, the degree of dilatation following is sufficient for many purposes ; but should it not be found so, on withdrawal of the tents the following morning, larger still can be inserted, taking the same precautions as on the previous evening. If, however, thorough exploration of the cavity of the uterus be demanded by means of the finger, an anæsthetic should be administered, and the remainder of the dilatation sufficient for this purpose can be secured by means of graduated metal bougies. It cannot be too strongly urged that no antiseptic precaution should be neglected, and that every care should be taken after dilatation to prevent any septic infection from reaching a recently dilated uterus.

For aseptic and anæsthetic purposes R. Lefour (*La Semaine Médicale*, No. 50, 1891 ; *Lancet-Clinic*) soaks his laminaria tents for eight days in

℞ Ether	- - - - - - -	fl ℥iiss.
Iodoform	- - - - - -	℥iiss.
Cocaine pur	- - - - - -	℈i.

Forcible Dilatation may be carried out by any of the different forms of dilators which have been devised for this pur-

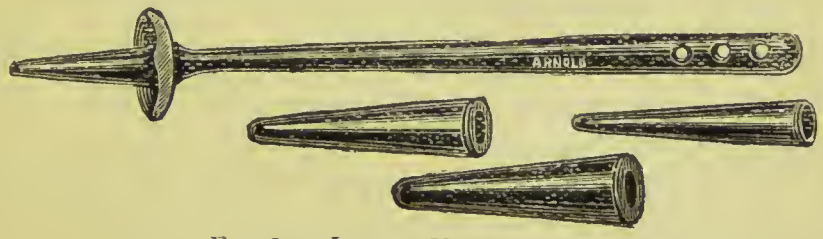


FIG. 80.—Lawson Tait's Dilators.

pose. In Hegar's (Kumerlé, Freiburg) dilators the size of each is marked on the short handle of the bougie ; this is simply a species of catheterization of the canal by short ebonite bougies. I have had specially made for the same purpose, and find they answer much better, solid conical metal bougies of pliable pewter, varying in their longest circumference from 11 millimetres to 59 ; but they may with benefit be two sizes larger than this last diameter. They have a bulbous

point, with a short neck, which gradually expands into a belly. The curve of the bougie is a circle, having a diameter of 25 centimetres. In using these bougies it is well to have the patient in the semi-prone or lithotomy position. The metal can always be kept smooth and bright, and, when oiled, slips with slight force through the cervical canal.*

Mr. Lawson Tait has devised a set of dilators, in three sizes, conical in shape, as shown in the figure (Fig. 80). They are made of vulcanite, and screw on to a common stem. By an elastic thread which passes through the holes in the stem handle, and is connected with a waistbelt by hooks, any degree of elastic pressure can be maintained on the conical dilator introduced into the uterus. Dilatation can be secured in from six to twenty-four hours.

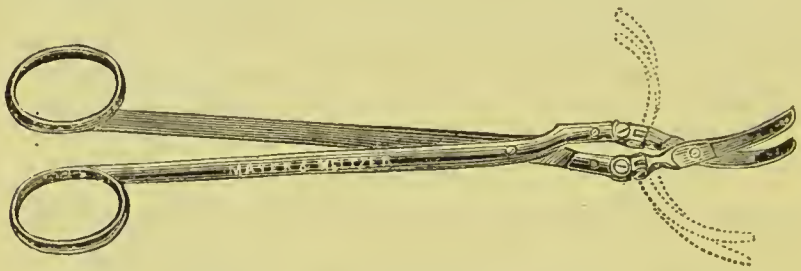


FIG. 81.—Useful Revolving Uterine Scissors of Heywood Smith.

Several varieties of metal dilators have been devised during the last few years, such as that of Wathan (Fig. 76).

Also, Reverdin has devised an irrigating dilator, one blade of which is hollow, to permit any hot antiseptic fluid to flow. Dilatation is said to be rendered more rapid and to be attended with less pain. Much has been said, in some recent discussions, on the harmful results that follow upon uterine dilatation. Certainly, if, as one authority stated, 'brutal' methods be adopted, then unquestionably there is danger. But if either tents or other dilators be used with prudence and care,† there should be but very slight risk attending their employment.

* See chapter on Dysmenorrhœa.

† See '*Dangers of Dilatation*' in chapter on Curettage.

CHAPTER III.

FIRST STEPS OF EXAMINATION OF A CASE (continued).

Mode of Examination.—I now assume that such a pelvic, ovarian, or uterine case as pelvic hæmatocele, ovarian tumour, or fibrocyst of the uterus, is brought for examination. Let us proceed to exhaust the means at our disposal, so as to arrive at a correct diagnosis. Before exposing the abdomen, we have taken the previous history, satisfied ourselves as to the character of the menstrual secretion, and inquired into the action of bowel and kidney; we have examined the temperature and pulse. We judge of the woman's countenance—if cheerful and hopeful, or expressive of pain and anxious; if emaciated or cachectic; if she have the characteristic *facies ovariana* of ovarian disease. There is in ovarian dropsy a strange mingling of emaciation of the face with some anxiety of the countenance, often out of all proportion to the interruption of the general health; it is altogether different to the countenance of pregnancy, and quite distinct from the cachexia of ordinary malignant disease. This appearance, however, we must remember, is influenced by complications, such as phthisis, hepatic or renal disease, pregnancy, or malignant disease of the ovary. But in hepatic and renal disease, we have other evidence—such as anasarca, icterus, distended abdominal veins, œdema of the face, hands, or feet, albuminuria, and perhaps cardiac complication—to indicate the cause of the distension. We now proceed to examine the abdomen. I cannot insist too

emphatically on the care with which we should explore the abdomen before we proceed to any internal examination. We do it thus:

Its Shape.—We notice if it be barrel-shaped and arched, as in ovarian dropsy, or if the swelling be unilateral or uniform; if the sides bulge, more or less, as in ascites, or if the tumour be evidently central, and if its ratio of increase have been regularly progressive, as in pregnancy; if there be distinct swellings in different regions, and the surface of the abdomen be irregular in outline, as in multilocular cysts, malignant solid growths, or tumours of the liver and spleen.

The Umbilicus.—Examine if it be prominent, as in pregnancy; bulging and watery-looking, as in ascites; drawn in, as in solid tumours with adhesions, and in malignant cases.

The Appearance of the Skin.—If tense and thin, showing the prominent recti muscles underneath; or œdematous, with a characteristic watery appearance; if it be laden with fat; if marked with lineæ albicantes, cracks, scars, maculæ, or any cutaneous eruption.

Measurements. — In ovarian dropsy the greatest circular measurement is at the umbilicus (more likely it is below it in ascites). Take lateral measurements to determine the symmetrical nature of the growth. During the early months of growth of an ovarian cyst these are unsymmetrical; they are symmetrical in pregnancy.

Palpation.—Nothing save experience in educating the finger to differentiate the various forms of tumours, solid and fluid, and any enlargements of the abdominal and pelvic viscera, can teach abdominal palpation. It is not to be learned by any verbal description. The size of an organ, the extent of an enlargement, the degree of hardness or softness, the character and extent of fluctuation, the nature and direction of the pain caused by pressure, the appearance of the fluctuating wave, and the sensation of superficiality or depth conveyed to the hand when testing the abdomen for this sign—all have to be kept in mind in palpation. A few directions may, however, be

of service. Have the patient's head and shoulders supported with a pillow; let the surface of the abdomen from the sternum to the pubes be exposed; stand facing the patient, and lay the palms of the hands lightly on the abdominal wall; gradually pass the hands over the various abdominal regions, hypochondriac, epigastric, lumbar, umbilical, inguinal, and hypogastric. With the fingers explore these spaces carefully; watch the patient's countenance for indications of shrinking or pain; define as far as possible the limits of any growth, the region it occupies, its connection with surrounding viscera, if fixed or movable, if hard or nodular, if soft or fluctuating; get the character of the fluctuation, if superficial or deep-seated. Now lay the hand on one side of the abdomen, and tap lightly with the fingers on the opposite side, and feel the nature of the transmitted wave; judge, by watching its movement under the skin, of its depth (deeper wave in ovarian dropsy), and, by its freedom of motion in all directions, of the character of the cyst in which it is confined, unilocular or multilocular, and if the fluid itself be encysted, circumscribed, or free.

It is quite possible in a very fat patient to mistake the 'fat-thrill' for fluctuation. 'To muffle this,' says Goodell, 'I ask one of my assistants to lay the ulnar edge of his hand along the linea alba. The pressure of the hand will act exactly like the damper-wedge of the piano-tuner, which muffles the sound of one string while its fellow is being tuned. By this means I get the wave-tap of a fluid, and am enabled unhesitatingly to say that there is a liquid collection in the abdominal cavity.' Thus a fat abdominal wall may completely obscure the diagnostic aid we obtain from our sense of touch, and has doubtless led to many of the errors of practice, recorded and unrecorded, in the operative interference with abdominal enlargement.

Percussion.—We require to distinguish the relative degrees of dulness or resonance in the different regions, above the umbilicus, below it, and in either flank, and the influence of posture on the percussion note. The rule is, that ascitic fluid

falls with gravity (if the fluid be free in the peritoneal cavity, and not restrained by adhesion) into the most dependent position, which is in the sitting position the lower zone of the abdomen, and in the recumbent posture the flanks. Hence these regions will give a dull note.

In ovarian dropsy, on the other hand, the cyst rising up from the pelvis is in front of the intestines, which are displaced to either side, so that the anterior surface of the abdominal wall yields a dull sound and the flanks are resonant. Nor, as a rule, is the dulness changeable with posture, and never to the same extent as in complicated ascites. The complication of pregnancy with ascites or hydramnios, of ovarian dropsy with pregnancy, ascites, or cysts of the liver or kidney, all of which we occasionally find, compel us to be very cautious in placing reliance on percussion in diagnosis. The abdomen must be most cautiously examined for the different conditions likely to be confounded with pregnancy. It requires occasionally most patient and careful listening to detect the fœtal heart-sounds, especially if there be a rather fat abdomen, any ascitic fluid in the peritoneum, or hydramnios, and if the fœtal pulsations be weak and rapid. We have to be careful not to fall into an error that I have known occur in a patient with a very rapid pulse, who suffered from an abdominal tumour which proved to be fibroid. The rapid aortic pulsations were transmitted to the tumour, and an opinion was consequently formed that the woman was pregnant. We must guard ourselves against the possibility of error, in cases of assumed pregnancy, by the use of an anæsthetic in the determination of a doubtful case, and to exclude the presence of a phantom tumour.

Digital Examination.—We now proceed to make a vaginal examination. The patient may be laid on her side, or, better, on her back, as I have previously described. The nail of the examining finger should always be pared close. We then anoint it with boracic vaseline or lard, and carry it gently into the vaginal canal. Before doing so, on separating the labia, it may be well to inspect the vulva for any swelling,

excoriation, discharge, sores, or tumours, and at the same time mark the appearance of the clitoris, urethral orifice, hymen (if present), fourchette, and note the temperature of the vagina. Having reached the uterus, we examine the condition of the os uteri, its shape and size, if normal or abraded, soft, patulous, or fissured. The cervix uteri is next examined, as to its position, shape, length, and degree of hardness. Placing the finger firmly on the cervix, we estimate by pressure the mobility of the uterus. At the same time we contrast the anterior and posterior wall of the cervix, examine for any sulcus in the uterus, any special hardness in the uterine wall, or any fibroid which may here be developing. The finger is now swept, commencing anteriorly, round the vaginal roof, and any fulness, contraction, hardness, or swelling is detected and examined. The degree of tightness or stretching of the vaginal roof is estimated. We next pass to the posterior aspect of the uterus, and explore the utero-rectal space and the pouch of Douglas. In this latter space we may find a tumour, ovarian cyst, a fæcal accumulation, some cellular and peritoneal effusion, the fundus of a retroverted uterus, or a prolapsed ovary. We take advantage of the act of respiration and the influence of the diaphragm on the pelvic viscera, by directing the patient during this examination to take a few deep inspirations, followed by prolonged expirations. This will help to bring the ovary more within reach of the finger. In many cases, by directing the woman to lie towards the opposite side to that of the ovary we wish to examine, and by passing the forefinger up (that of the right hand for the left ovary) to the vaginal roof, while with the fingers of the other hand we firmly depress the abdominal wall into the pelvis, we can get the ovary between the fingers and define its limits and also trace the Fallopian tube for its entire extent. While thus examining, we do not forget the possible presence of stone in the bladder, which may be detected through the vaginal wall in front. Before withdrawing the finger we satisfy ourselves thoroughly as to the character of recent effusions,

the size of the ovaries, or if the remains of any old effusion occupy the cellular tissue, or should be inside the peritoneum.

Conjoined Examination.—This we carry out either by the two hands or by the sound and hand.

By the hands	Abdomino-vaginal. Recto-abdominal. Recto-vaginal.
By the sound and hand	Utero-abdominal. Utero-rectal. Recto-vesical.

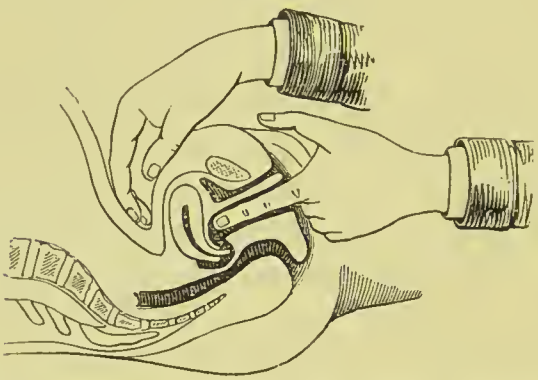


FIG. 82.—Abdomino-vaginal Examination (Schroeder).

Abdomino-vaginal.—We want to ascertain the size of the uterus, its degree of mobility, its sensitiveness; the condition of the bladder, ovaries, and broad ligaments. We do this in the most satisfactory manner by placing the fingers of the right hand on the abdominal wall above the pubes, and the index-finger of the left in the vagina, resting on the cervix (behind it if the uterus be retroverted), thus getting the organ between the two hands in the manner shown in the diagram. In every case of obscure uterine affection, when we wish to know accurately the volume of the uterus and its relative increase in size, this is an indispensable step in our examination. Howard Kelly insists on the importance of this method of examination in palpating the ovaries (*American Journal of Obstetrics*, vol. xxiv., No. 2, 1891): 'The invagination of the pelvic floor is of

the utmost importance, as by this means the examining finger is practically lengthened by the amount of the invagination, or, what is the same thing, the vagina is shortened.'

Recto-abdominal.—Withdrawing the finger from the vagina and again anointing the surface, we pass it gently into the rectum. In doing so, we reach, unless the uterus be retroverted, the cervix uteri, and feel it prominent through the anterior wall of the rectum. *Depressing the uterus well* with the fingers on the abdomen, we now reach the ovaries, which can again be explored, and their size and sensitiveness ascertained. We may also satisfy ourselves of the volume and position of the uterus, of the dimensions of a fibroid or a retro-hæmatocele; while we likewise judge of the degree of congestion of the rectal mucous membrane, and the extent to which the rectum is interfered with either by cellular effusions, collections of fluid, tumours in Douglas's space, or a retroverted uterus.

Recto-vaginal.—Still keeping the finger in the rectum, we insert the index-finger of the other hand into the vagina, or, if we prefer it, we may withdraw the index finger and introduce the middle finger into the rectum, while we explore the vaginal wall with the index-finger of the same hand. Examination of the rectum often gives such distress to the patient, that the less frequently we introduce the finger into it the better. Therefore, I generally prefer to use the index-finger of the right hand in the vagina, the woman lying on her back, the left forefinger remaining in the rectum. We can thus in the very best manner determine the state of the rectum, the utero-rectal space, the position and size of the ovaries, and the character of any tumour, swelling, or effusion between the uterus and rectum.

Recto-vesical.—We may now take up the uterine sound and slip it into the bladder while we retain the finger in the rectum. We thus are enabled to judge of the position and size of the uterus in fat women, in whom palpation is difficult, of its presence in atresia of the vagina, of its absence in inversion of

the uterus, and to diagnose between inversion and polypus. While the sound is in the bladder, if there be vesical irritation, we may explore its cavity, judging of its capacity and how far it is encroached on by the uterus, while we exclude the existence of stone (Fig. 80).

Utero-abdominal.—Having passed the sound into the uterus and judged of its sensitiveness, position, and mobility, and the length of the uterine cavity, or the presence of any obstruction,

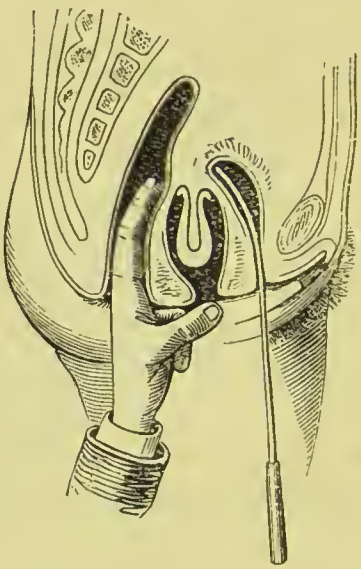


FIG. 83.—Recto-vesical Examination in complete Inversion of the Uterus.

we place, as before, the finger of the right hand over the pubes and manipulate the uterus on the sound. In diagnosing the relations of abdominal tumours, their connection with the uterus, and the extent to which the uterus is involved by fibroid growths, or polypus, the utero-abdominal method will often be found to give valuable assistance.

Utero-rectal.—Still retaining the sound in the uterus and passing the finger into the rectum, we can in a similar manner examine the posterior wall of the uterus, judge of the intramural fibroids, any adhesions posteriorly, the degree of retroversion, how far the uterus is fixed by any effusion, and to what extent its freedom of movement is limited.

MEDICAL PUBLISHING

Other Steps.—In a large proportion of cases the examination just detailed, in part or whole, will enable us to arrive at a conclusion as to the nature of a case. It may, however, happen that doubt still remains. There is some discharge from the uterus, and we have to satisfy ourselves as to its source and nature. On examination with the finger, the feeling of the os uteri and cervix prompts us to use the speculum. An abdominal tumour exists, regarding the exact nature of which, or its contents, we are not perfectly satisfied. There is a quantity of abdominal fat or tympanitic distension of the abdomen, or the difficulty of making a satisfactory examination of the patient has been great. This may also result from nervousness, or sensitiveness and tenderness of the vagina.

Speculum.—In the case of discharge, we have to use the speculum to examine the os uteri, and judge of the source and nature of the discharge. Also it may be requisite to see the vaginal walls; if they be stripped of epithelium, or granular and secreting a quantity of vaginal mucus. A beginner may have some difficulty in passing the sound in the usual manner into the uterus. By placing the patient in the semi-prone position and using Sims' speculum, he can generally do so with ease. Or if she lie on her back, and a tubular speculum be inserted, he can bring the os uteri into view; and then, if the uterus be in its normal position or anteverted, by dipping the sound well down, he can, unless there be some obstruction, pass it on into the cavity.

Tents.—A tent or uterine dilator may have to be employed, if we desire to explore the uterine canal in cases of suspicious and prolonged hæmorrhage, when we suspect intra-uterine or placental polypi, or where there is septic discharge, the consequence of any intra-uterine decomposition.

Aspiration.—We may draw off a small quantity of fluid from a doubtful abdominal swelling, to determine its nature by chemical or microscopical tests; this may be done with the ordinary hypodermic syringe or aspirating needle. The aspirator is specially useful for diagnosis in doubtful pelvic and uterine

enlargements, such as retro-hæmatocele, cystic tumours in Douglas's space, pelvic peritonitis, and retained menses.

It may be safely said that the more experienced our tactile sense becomes, the less we require to use either sound or aspirator, or even the speculum, in diagnosis. Careful digital examination, aided by palpation, and by taking advantage of posture, is generally sufficient to enable us to come to a correct conclusion. But in all cases of doubt and difficulty it is better to exhaust the means of examination than to commit an error in diagnosis. To no aid in examination does this remark apply more than to the use of an anæsthetic. We do not avail ourselves as often as we should of anæsthesia in the elucidation of difficult questions arising in connection with complicated and obscure abdominal cases. It is not too much to say that in any such no final verdict should be given without its help.

It is in those cases in which difficulties arise, either from the quantity of fat in the abdominal cavity or gaseous distension in the bowel, where there is great pain and sensitiveness on the least attempt at examination, or when a patient is debilitated or weakened by previous prolonged suffering, that an anæsthetic is specially called for. In children and young girls an anæsthetic is often essential in order to make a thorough examination. Cocaine may be used, but I prefer, for complete examination, when any anæsthetic is required, either ether or chloroform. I feel confident that many errors of diagnosis would be avoided if we more frequently had resort to anæsthetics in examination of the abdomen and pelvis.

Rectal Exploration (*Simon's Method*).—This plan of exploration of the abdominal viscera is seldom practised in this country. In the instance of a mesenteric mass causing partial ascites and abdominal enlargement, I was recently assisted in diagnosis by rectal palpation of the pelvic viscera. The woman should be fully anæsthetized. She is placed in the lithotomy position, her thighs are well drawn up to the abdomen; the sphincter ani is then thoroughly dilated by the fingers, or, better, by the thumbs; gradually the hand, well oiled, in the form of a cone, is most cautiously introduced in a rotatory fashion; when the hand has passed into the bowel, the fingers can be separated a little so as to explore the pelvic organs; two fingers may be passed on into the sigmoid flexure of the

colon. My hand measures, at the line of its greatest circumference, eight inches. I have thus introduced it without lacerating the anus. This is not the rule; even with the greatest care and a small hand, some sphincter fibres will be ruptured, and in some patients it is impossible to introduce the hand without serious injury to the sphincters and bowel. In ordinary dilatation of the sphincters for obstinate costiveness it is not necessary to introduce the whole hand. It is superfluous to point out how cautious must be the manner in which this procedure is conducted, and how seldom it is needful, considering the other means of diagnosis at our disposal. I may here draw attention to the methods of exploration adopted by Professors Naunyn and Ewald, the former injecting and filling the colon with water by the syphon plan, the latter inflating the intestines with air, so as to make the situation and relation of tumours to or in the abdominal viscera and intestines clear.

The Value of Rectal Exploration in Female Children.

George Carpenter, of the Evelina Hospital for Sick Children, has written some important communications on the value of rectal examinations in the diagnosis of pelvic disease in children. He instances several cases in which grave conditions were discovered through combined rectal and abdominal examination by means of anæsthesia. The patient's legs are well drawn up, and the thighs are flexed on the abdomen. The pelvis is raised on a cushion, and, with the left hand placed on the abdomen, the right side of the abdominal cavity is explored with the right index-finger. The hands are reversed to examine the left side. The bowel and bladder have been previously emptied. The author has thus been able to diagnose and map out the position of a horseshoe kidney. By this means the appendix, the iliac fossa, the uterus and annexa, may be explored, and the position of tumours or collections of fluid determined. Carpenter's remarks on the relations and dimensions of the female pelvic organs in children are of importance.

The Pelvic Organs in Children.—'The sacrum in children is almost straight, and so is the rectum, the direction of the bowel being probably influenced by that of the bone. The infantile bladder is egg-shaped, with the larger end downwards, and as the pelvis is shallow, it is almost entirely an abdominal organ; but as soon as the child begins to walk the bladder sinks more into the pelvis, though even then its attachments are so loose that it readily rises wholly into the abdominal cavity when distended or otherwise displaced, a feature observed until puberty is near at hand. The uterus in the child is almost entirely made up of cervix, there being very little body, and it lies in

the upper part of the pelvis. At birth the ovaries have descended as far as the brim of the true pelvis, but in children a few weeks old they are found close to the external iliac arteries at the side of the pelvis.

'I have found, however, the uterus and appendages well above the brim of

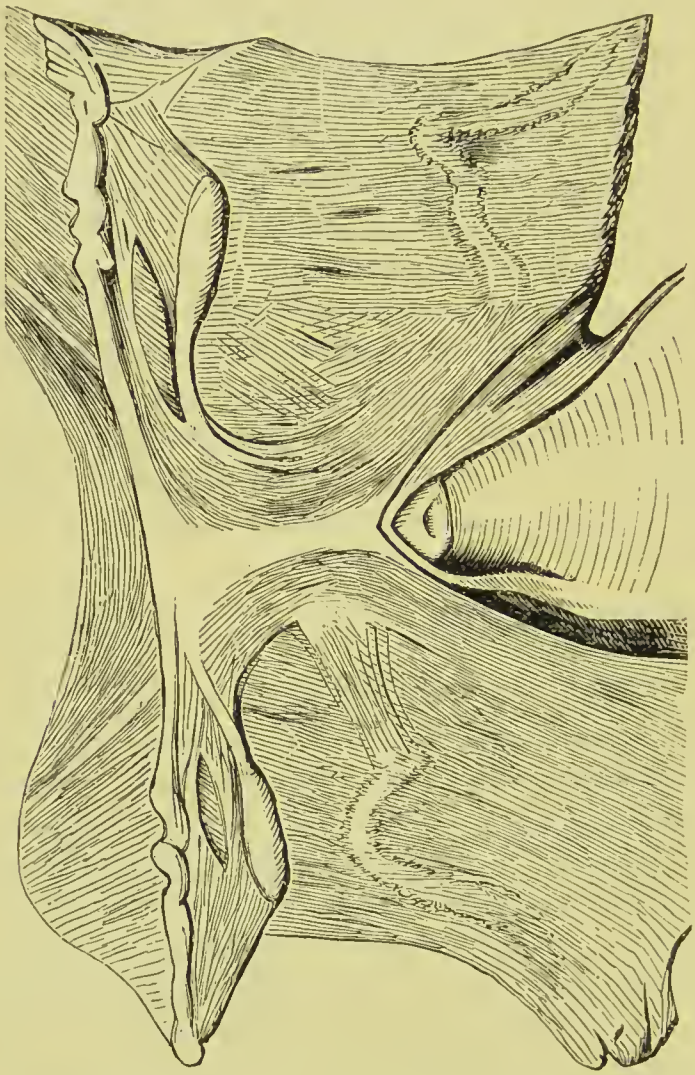


FIG. 84.—Genital Organs removed from a Female Child, aged two years four months (George Carpenter). Vagina opened behind, showing the external os uteri. The ureters are dimly outlined on either side. The round ligaments are ill developed.

the pelvis on making a rectal examination in a child seven months old. Fig. 85 is a sketch of the tubes and ovaries of a child aged two years and four months that I made *ad naturam*, which shows the relative positions. Another sketch gives the exact size of these organs when removed from the body. It will be seen that the uterus is about 1 inch long and ½ inch broad at the fundus,

the tubes about $1\frac{3}{4}$ inches, the right ovary $\frac{5}{8}$ inch in length, and the left $\frac{1}{2}$ inch in length, and each about $\frac{1}{8}$ inch in diameter. The ovaries vary in size from $\frac{5}{16}$ inch long by $\frac{1}{4}$ inch broad in a child a few weeks old, to organs measuring $1\frac{1}{2}$ inches by $\frac{1}{2}$ inch in a child approaching puberty. Intermediate sizes are found according to the age of the child, but ovaries show some variation in size in children of similar ages. The organs are for the most part elongated oval in shape, but organs that are more or less round are occasionally found, and one ovary is not infrequently decidedly larger than its fellow. The

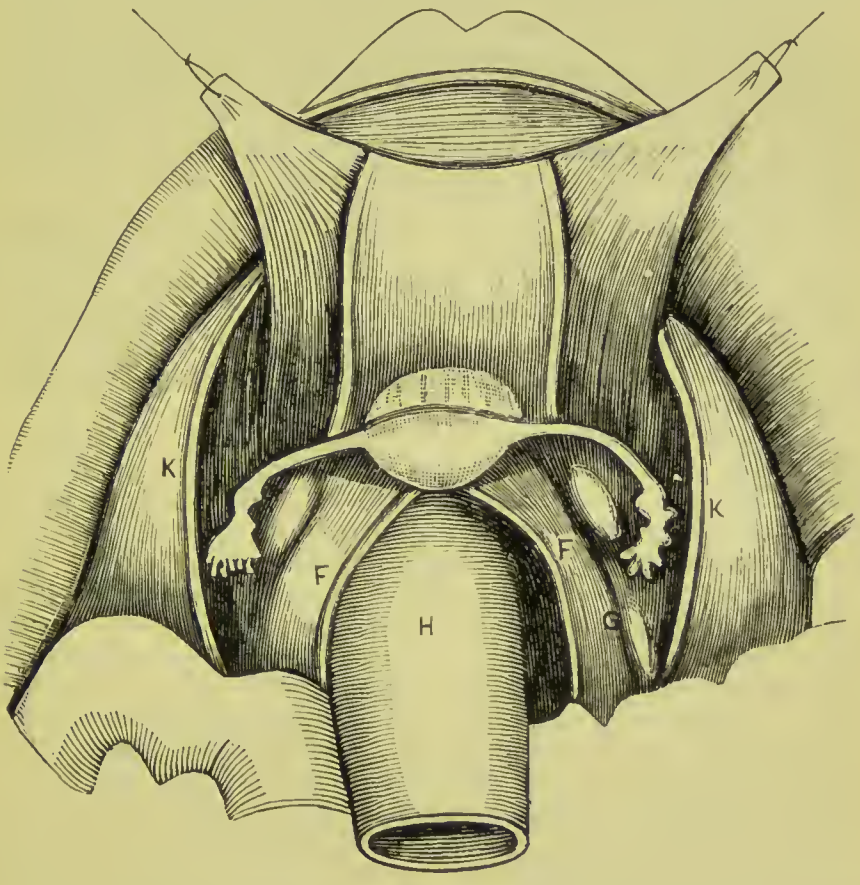


FIG. 85.—Pelvic Organs of a Female Child, aged two years four months (George Carpenter). *f*, falciform or utero-sacral ligaments; *g*, right ureter; *h*, rectum; *k*, brim of pelvis; *l*, reflected abdominal wall.

Fallopian tubes, roughly estimating their diameter for clinical purposes, are about equal to the vas at a similar age at their narrowest part, but they gradually enlarge as they pass along to the fimbriated extremity; in length they vary from a little over 1 inch to a little over 3 inches, according to the age of the patient. The important anatomical guide to these structures when making a rectal examination is the falciform ligament. This falciform ligament, or the utero-sacral ligament, if that term be preferred, forms a sickle-shaped curve surrounding the rectum, attached behind to the sacrum, and in front to

the lower part of the cervix. This is very well seen in both drawings (Figs. 84 and 85), and when the finger has passed some little distance up the rectum, its sharp edge is readily found, and is unmistakable. Using this structure as a guide, the tubes and ovaries, which, as the drawing (Fig. 85) shows, are on a higher plane, can be readily manipulated between the exploring finger and the bony wall of the pelvis, or bimanually, and whilst these structures are being examined the ureters, the right being shown in the drawing as it crosses the pelvis and disappears under the corresponding tube and ovary, can be examined.

'It is sometimes possible to detect in the ovaries the small *cysts or dropsical Graafian follicles*, which are not infrequently found post-mortem. The uterus, being a freely movable body, is not easily detected in this way, and readily eludes the finger, which pushes that organ before it; but by a bimanual examination any marked abnormality could be easily appreciated, if the bladder be emptied. In young children the uterus can be rolled between the finger and the symphysis pubis, and its contour made out with ease.

Displacements of the ovaries and tubes into the inguinal and crural openings sometimes occur. The youngest ovariotomy on record is by Chiene,* of Edinburgh, in a child of three months. A swelling in the inguinal region suddenly occurred, and when various measures had been adopted for its relief, the infant was operated upon. The contents of the sac were the ovary and Fallopian tube. A rectal examination was not made, but if it had been, a fresh light might have been shed on the case.

'*Tuberculous disease of the Fallopian tubes, the uterus, or the ovaries* is extremely rare in children; and so rare is it that I think I could count on the fingers of one hand the number of cases I have seen diseased in this way, both in the dead-house and, what I have supposed to be tuberculous, in practice. The pathological specimens in museums are few and far between. In the Guy's Hospital museum there are but two specimens: one, 2251[10] (Bright, 1829), aged eleven years, who died of "strumous inflammation of the brain" and lung tubercle; another older specimen still, 2251, of a child with tortuous tubes distended with cheesy matter. Chaffey† published a case in a child of four years, whose tubes were caseous, and the upper part of the uterus was caseous; she died of general tuberculosis. Silcock‡ also records a case in a child of five years of age, who had tubercular salpingitis, endometritis, and a tubercular deposit in the body of the uterus the size of a walnut; she also died of general tuberculosis. Arthur Cheatle,§ when registrar at the Evelina Hospital, found in the post-mortem room, in a child of twenty-one months, tubes filled with pus, the left being in communication with an abscess cavity holding one drachm. This case also died of general tuberculosis.'

Carpenter gives the particulars of a case operated upon by Eve, in which an ovarian cyst burrowing down between the layers of the broad ligament was diagnosed by rectal examination in a child aged twenty-two months, the subject of congenital syphilis. The cyst measured $1\frac{3}{4}$ inches by $1\frac{5}{8}$. Carpenter has collected the particulars of thirty-five cases of ovariotomy performed on children under twelve years of age—viz., dermoids, 15; cystic, 10; sarcoma, 6; carcinoma, 2; malignant tumour, 1; cylinder epithelioma, 1.

* *Edinburgh Medical Journal*, 1884, p. 1132.
† *Path. Soc. Trans.*, vol. xxxvi., p. 303, 1885.
‡ *Ibid.* § *Lancet*, 1891, p. 1098.

Roemer's case of successful ovariotomy was in a child twenty-one months old. Rosenstein found carcino-sarcoma of the uterus in a child aged two years, and sarcoma of the vagina has been recorded in several cases under twelve years.

Discharges.—In inflammatory states of the female genito-urinary organs, the nature and character of the discharge found, on vaginal examination, coming from the uterus, or in the vagina, and spontaneously appearing at the vulva, is of considerable moment in the diagnosis.

The following table may assist the student:

DISCHARGES.

CHARACTER.	SOURCE.	APPEARANCE AND PROPERTIES.
Watery (hydrorrhæal), and mixed.	*Uterus.*—Accompanying and following pregnancy; associated with malignant disease, hydatids. *Vagina.*—Vesico-vaginal fistulæ, rupture of ovarian cyst. Discharge frequently physiological, both from uterus and vagina; the quantity of water the vagina can secrete is shown in the profuse discharge after a glycerine plug is worn in it.	At times colourless, or mixed with blood, and with cells of different kinds, or containing shreds of decomposing débris, or hydatids, or urine.
Mucous and epithelial, often containing epithelial débris, oil-globules. Frequently only physiological exaggeration	*Fallopian tubes.* *Cavity of fundus uteri.* *Canal of cervix uteri.*	Whitish, alkaline, columnar epithelium; at times viscid, like unboiled white of egg; when aggravated, fills the cervix and os uteri as a tenacious plug most difficult to remove, and is quite

DISCHARGES—*continued.*

CHARACTER.	SOURCE.	APPEARANCE AND PROPERTIES.
of the normal secretion, as in pregnancy, or associated with menstruation.		characteristic of endometritis. It may be the cause of sterility. Where the secretion is simply increased, and attends corporeal leucorrhœa, it is known as the 'whites,' and is, as a rule, a proof that the general health is suffering, as in anæmia, leukæmia, and after metrorrhagia.
	External surface of cervix and the lips of the os and fundus of the vagina. Seen occasionally in excess during pregnancy.	Acid reaction; varies in consistence — generally thick, creamy, white, or yellowish-white, adhering often closely to the os and cervix uteri, and almost membranous in character; squamous epithelial cells, oil-globules.
	Some portion of vagina.	Acid mucus; character depends on the nature of inflammation; contains at times parasites and fungi—*Trichomonas vaginalis*; *Leptothryx buccalis.*
Sebaceous, readily becoming purulent.	*Vulva, labia, vulvo-vaginal glands, sebaceous glands.*	Acid fatty mucus, oily particles, epithelial cells.

DISCHARGES—*continued.*

CHARACTER.	SOURCE.	APPEARANCE AND PROPERTIES.
Purulent.	*Fallopian tubes.*—Purulent discharges may come from the Fallopian tubes, the result of salpingitis. *Uterus.*—From any part of the uterus, mingled with mucus; from the vagina and vulva. *Vagina.*—Pus may find its way into the uterus through fistulous openings, and into the vagina either by the bursting of a suppurating cyst which has formed adhesions, or the escape of pus from a pelvic abscess, the consequence of pelvic peritonitis, or a pelvic hæmatocele. The source of this pus may be a fistulous opening from the bladder or urethra in cases of pyelitis or cystitis.	The appearance of the purulent secretion will, in great measure, depend on its source and the form of inflammation that has produced it; it may be profuse and thick, scanty and thin, very fœtid or almost odourless, tinged with blood or rusty-looking, or of a dirty greenish colour. The discharge of vaginitis is, as a rule, profuse, pouring out in quantity, and is, especially if it be gonorrhœal, thick, yellow, and persistent. It is mingled with epithelium.
Hæmorrhagic (excluding the hæmorrhages of pregnancy). The blood at times is mixed with menstrual discharge, or is merely al-	Blood may pour from any portion of the generative tract. We have three principal heads under which we may classify the occurrence of all hæmorrhage. *Uterus and Fallopian tube.*—1. Menstrual or altered menstrual flow. 2. In salpingitis, me-	The blood may be arterial or venous, dependent upon its cause, whether there be active or passive congestion, due to direct rupture of vessels from ulceration and slough, or their injury by laceration,

DISCHARGES—*continued.*

CHARACTER.	SOURCE.	APPEARANCE AND PROPERTIES.
tered menstrual flow, excessive in quantity (menorrhagia); the blood is then mixed with the débris of uterine tissue, epithelial cells, fatty and oil particles, mucous corpuscles, or if there be ulceration, pus, and the products of inflammation.	tritis, endo-metritis, catarrhal cervicitis, subinvolution, uterine fibroid, polypus of any kind, granulations, vascular tumours, urethral caruncle. 3. Traumatic injuries—operations. *Vagina.*—Same constitutional causes as produce hæmorrhage from the vulva; granulations; abrasions; ulceration; varicose states; thrombus; traumatic causes; malignant disease. *Rectum.*—Hæmorrhoids; congestion of the rectal mucous membrane; fissure; ulcer; malignant disease; traumatic causes. Bleeding from the rectum may accompany hæmorrhagic discharge from the vulva and vagina. *Vulva;* in the exanthemata — (variola, typhoid and typhus fevers, measles); spinal meningitis; malignant ulceration; gangrene; noma; thrombus, varicose conditions; various blood states, as in leucocythæmia and	or wounds of any kind. In the various morbid conditions of the blood, and during the exanthemata the blood poured out is generally dark and does not readily coagulate, rendering the hæmorrhage difficult of suppression.

DISCHARGES—*continued.*

CHARACTER.	SOURCE.	APPEARANCE AND PROPERTIES.
Hæmorrhagic (*continued*).	scurvy; in the hæmorrhagic diathesis; wounds, operations, coitus; from vascular excrescences, and tumours.	
Such as are connected with menstruation and often associated with irregularity of the menstrual periods.	1. Simple menorrhagia — physiological excess attendant upon ovulation; in plethoric states from excess of coitus; excessive menstruation at the 'change of life'— during the menopause; from suppressed skin secretion — the result of cold taken previous to or during menstruation.	
Hæmorrhage due to disease elsewhere.	2. Uterine hæmorrhage dependent upon hepatic, cardiac and renal affections; in phthisical states.	
Hæmorrhage directly due to abnormal uterine states, and morbid changes in the uterine tissues.	Uterine hæmorrhage associated with uterine hyperplasia, subinvolution, hypertrophy; versions and flexions, simple congestion, of cervix or body, stenosis, metritis, endometritis, fibroid enlargements, polypi, granular states of the endometrium, fissure of the os uteri and	

DISCHARGES—*continued.*

CHARACTER.	SOURCE.	APPEARANCE AND PROPERTIES.
	cervix, thrombus, malignant disease, extra-uterine fœtation, syphilitic disease, wounds.	
Air (physometra). The air is expelled by the muscular action of the vaginal wall.	*Uterus and Vagina.*—In the knee and elbow position air enters the vagina more or less readily when the vaginal walls separate; also in the semi-prone position. Air may accumulate when a pessary is worn, if there be a fistulous communication with the bowel, or in prolapsus uteri.	

Most careful exploration of the vagina, uterus, and rectum is necessary in order to detect a minute fistulous communication of the vagina with the bowel, or of the uterus with either the bowel or bladder. The injection of a little milk or coloured fluid may assist in the detection.

The Microscope.—We bring the microscope to our assistance in the examination of suspicious discharges; in determining the nature of the cells contained in cysts—ovarian, hydatid, or malignant, and in hæmaturia. In those cases of disease of the fundus or cervix in which, as in sarcoma or scirrhus, we may be uncertain of the nature of the growth, we can remove a little with Simon's scoop, or a curette, for microscopical examination.

The Ophthalmoscope in Diagnosis.—Did space permit, I might enter more fully than I am now enabled to do into the subject of ophthalmoscopic examination, in the diagnosis of

uterine affections, and other diseased states which either complicate or originate the retinal disorder. It is not too much to say that every educated physician and surgeon should at least know sufficient of the ophthalmoscope to be able to diagnose an albuminuric retinitis, a hæmorrhagic infarction due to temporary retinal congestion, a choked papilla, the retinitis attendant upon diabetes, the striæ and exudation of syphilis, the disseminated choroiditis of the same disease, the retinitis of pernicious anæmia, or the leukæmic retina of anæmia and leukæmia. This practical acquaintance with the use of the ophthalmoscope is of still greater value in the diagnosis of diseased conditions both during and after pregnancy.

It is well known how frequently some retinal extravasations are the result of secondary cardiac mischief, which has its source in vascular changes due to morbid states of the blood—as, for instance, in Bright's disease or diabetes. Most important are such ocular disturbances in pregnancy. This is obvious when we remember the effect produced on the blood by pregnancy, and the relative importance which it has to the safety of the patient—both as an indication of head complications and other hæmorrhagic discharges, either before or during labour.

L. de Wecker cites the following case ('Ocular Therapeutics,' by L. de Wecker, trans. by Litton Forbes):

'I was requested some five years ago to examine a young American lady, twenty years of age, who was in her seventh month of pregnancy, and who complained that her sight had been somewhat dim during the last few days. Her husband begged me to examine her that very evening, although to do this I had to disturb a large dinner-party, which neither the condition of her sight nor health prevented her taking part in. I found that there was a very slight haziness of the retina in the neighbourhood of the papilla in both eyes, and deferred further examination till the next day. At ten o'clock the following morning the ophthalmoscope showed on the left, near the papilla, a small extravasation, which certainly could not have escaped my investigation of the previous evening. Meeting a colleague, in consultation, I informed him of the fresh hæmorrhage in the left eye and the increased haziness of the papilla, and begged him to allow premature labour to be brought on. I felt convinced that it would not be long before serious brain symptoms would declare themselves, and that in any case this primipara would not arrive at her full time without some accident. One of the most celebrated accoucheurs in Paris was called in further consultation, but I was unable to convince him of the urgency of this danger. During the night which followed this consultation—that is to say,

four days after the first ophthalmic examination—the patient was seized with convulsions, following each other in rapid succession. In all haste Dr. Campbell was sent for, but he did not feel justified in forcibly delivering a patient who lay unconscious and in a moribund condition. Death occurred the following night.'

There can be little doubt that at least 10 per cent. of cases of Bright's disease suffer from retinal complications. This is placing the number at a low figure.

A short time since, a patient came a long distance to consult me for failing vision in both eyes. On examination, well-marked nephritic patches were seen on the retina in one eye, and the characteristic scattered dots in the other. The urine had a specific gravity of 1008, no albumen present, but there were renal casts and epithelium; the other symptoms pointed to the presence of granular kidney, which up to this had been unsuspected.*

Not in this case only has it been my lot to be the first to discover—by the ophthalmoscope—the danger that threatened the patient, and I feel assured that were the use and knowledge of this instrument generally insisted on, many diseases would be more frequently recognised in their earlier stages, and a timely warning given. In noticing L. de Wecker's allusion to the contra-indication of hot baths in retinal lesions dependent upon nephritis, I am reminded of two cases of sudden death occurring within my own experience which were caused in this manner. The last instance was that of a lady who noticed that her vision was affected for a few days, and called on me to have an examination made. I happened to be absent. She left word that she would come the next day. That night she took a hot bath, which she had frequently taken before, was attacked while in the bath, and died in a few hours of apoplexy. An ophthalmoscopic examination that day might have saved her life. But I could multiply instances in which both the detection and diagnosis of existing disease have been due to the ophthalmoscope. 'The retinitis of malignant anæmia is so constant,' says L. de Wecker, 'that it may be looked on as pathognomonic.'

* An exactly parallel case I have recently had. A primipara, aged 26, in the fifth month of pregnancy, was sent to me by Dr. Atkinson, of Surbiton. There were ocular symptoms, twitching of the eyelids, dimness of vision, with some pain and frontal ache. There was some 50 per cent. of albumen in the urine. The papillæ were hyperæmic, and there was a surrounding haziness. Labour

PLATE I.

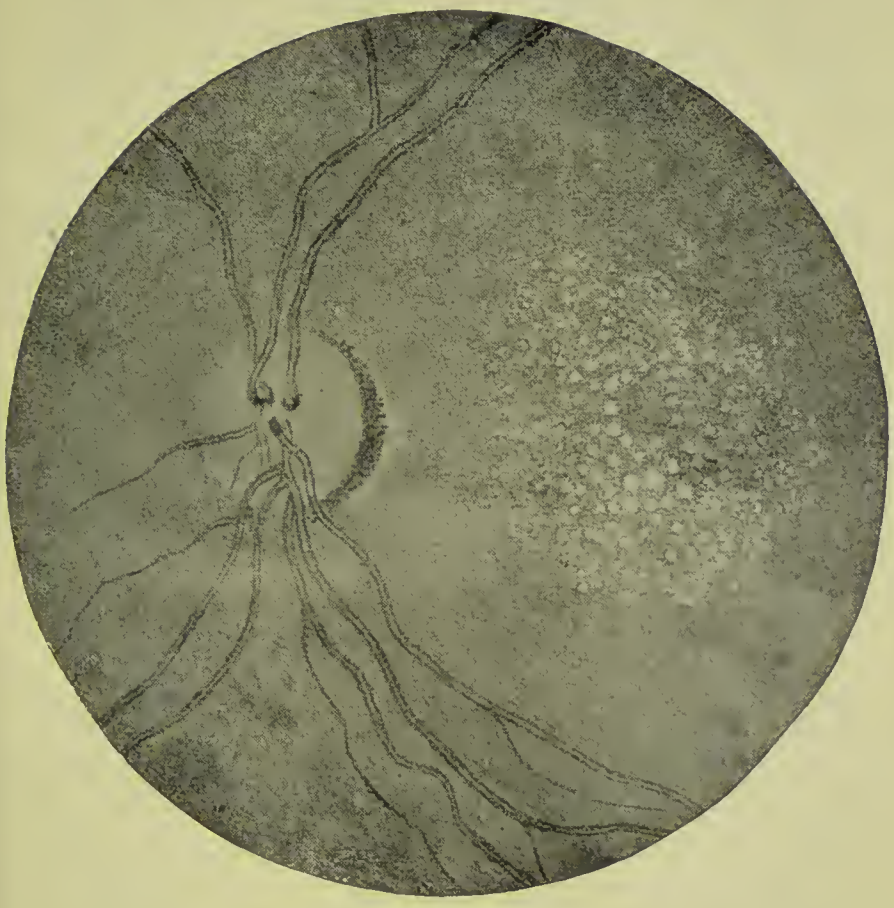


FIG. 1.—Central Choroido-retinitis. Appearance of the left fundus following upon parturition and severe post-partum hæmorrhage. The patient, aged thirty, sent by Dr. William Slimon, was seen by me six weeks after labour. The papilla was partially atrophied. The group of white dots is seen in the region of the macula. Here also were some remains of hæmorrhagic infarctions. The group of dots was quite distinct from uræmic patches. It corresponds with the retinitis guttata of Mr. Nettleship. This patient died four years subsequently of uræmic and other complications.

I have inserted this drawing and the two following to illustrate the remarks in the text on the value of the ophthalmoscope in diagnosis.

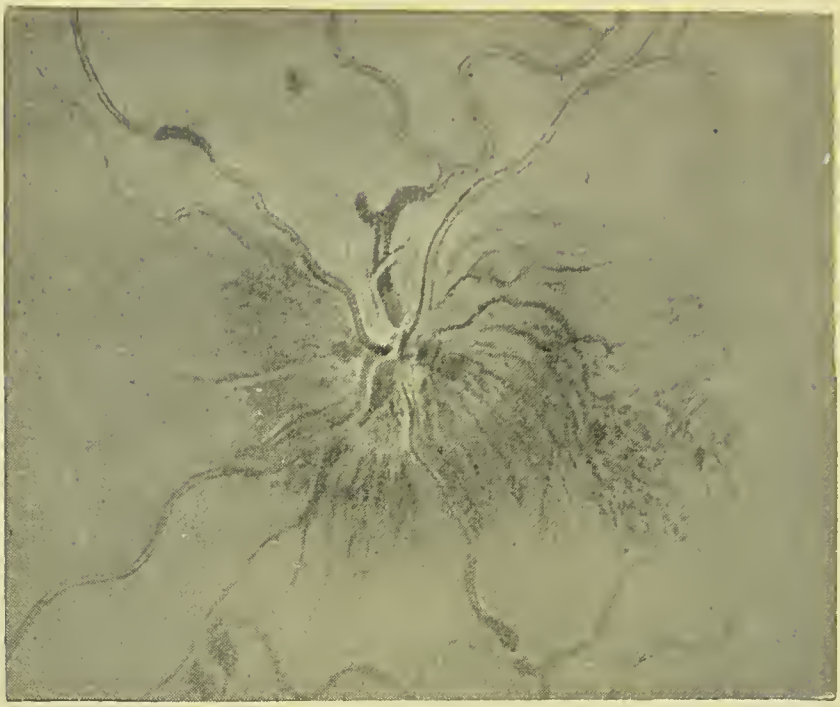


FIG. 1.—Choked Optic Papilla of the patient referred to at p. 104, occurring during suppression of the catamenia.

FIG. 2.—Same Papilla when recovering.

Not long since a lady suffering from well-marked diabetic retinitis of both eyes came under my care; in each eye there was a hæmorrhagic effusion. Again, in a case of pruritus complicating visual trouble, the state of the retina led to a urinary examination, and confirmed the suspicion of diabetes. Recently a patient consulted me for loss of vision in one eye, and impairment in the other, due to thrombosis of a retinal vessel in the region of either macula, occurring at the menopause.

The patient from whom the drawing (Plate 1) was taken never had had any affection of the eye before parturition. Three days after her labour, which took place on January 7, when very severe post-partum hæmorrhage occurred, she found the vision of the right eye defective. She was sent to me by Dr. Wm. Slimon on the 20th of the following February. On that date the appearances were as shown in the drawing, which was carefully made a few days subsequently by Mr. Burgess. The vision then was reduced to the counting of fingers at a distance of 5 feet. The entire region of the macula was dotted over with white dots. It presented much the look of a retina suffering from Tay's 'choroiditis guttata' (centralis), or the spots of 'disseminated choroiditis,' which has been described by various authors.

In this case there had been no albuminuria during pregnancy. The vision was suddenly affected, and the appearances are quite distinct from those seen in the retinitis albuminuria of pregnancy and Bright's disease. It seems to me that there was after the labour some infarction of the retinal vessels following on the severe uterine hæmorrhage, and that possibly a state of thrombosis was induced. This set up an irritation in the region of the macula, which was followed by the peculiar effusion. The exact nature of these dots is not understood. Hutchinson believes them to be colloidal.

The experience gathered from twenty-eight years' ophthalmic practice impels me to urge on the obstetric practitioner and student the great value in diagnosis of this simple instrument.

I can only repeat that I have known persons whose symptoms were ascribed to amenorrhœa, hysteria, anæmia, a disorder of pregnancy, a dyspeptic state, gastric disturbance, or liver derangement, in whom an ophthalmoscopic examination and the discovery of optic neuritis, choked disc, detached retina, retinal apoplexy, pulsating vessels, Bright's degeneration, or syphilitic effusion, would have afforded a clue to a correct diagnosis.

The following case will serve to illustrate these remarks:

was induced the following day at 3.30 p.m., convulsions beginning at 11 p.m. The uterus was emptied at 1 p.m., an adherent placenta giving some trouble. The patient was kept under chloroform from 11 p.m. until 2.30 the following day, convulsions recurring on any withdrawal of the anæsthetic. A subcutaneous injection of one-tenth of a grain of nitrate of pilocarpine was then administered, producing rapidly its full physiological effects, after which the convulsions ceased, and the patient made an excellent recovery.

Miss C——, aged thirty-four, consulted me on July 3 for sudden loss of vision in the right eye. Menstrual periods had not been very regular for some time, and the loss of sight occurred just at the approach of a catamenial epoch. The menstrual irregularity was attended by general failure in health, but she had not given up her employment. She first noticed the sight affected on June 29. She could then barely discern an object. On examination of the fundus, the optic disc presented the appearances shown in Fig. 1, Plate II., which was most faithfully drawn by Mr. Burgess on July 4 and 5. From this latter date the eye was placed under the influence of eserine, 1 per cent. As it caused slight pain, I then substituted pilocarpine, 1 per cent. Also she took internally ʒi. doses of the liquid extract of ergot. On July 18 she read $\frac{20}{70}$ (Snellen), and on July 23 was able to read $\frac{20}{20}$. On this day I again examined the fundus. The appearance of the papilla (June 24) is shown in Fig. 2. There was no assignable cause, save the menstrual association, for the thrombosis. There was no albuminuria. Pain in the eye or head was absent. The relief afforded by the treatment has been permanent. This may be explained by the freedom of the macula from effusion.

Eye-strain in Women.—I would here draw attention to a most important complication which will be found in a certain proportion of patients who consult us for female disorders. I refer to eye-strain, with all its consequences on the nervous system. This eye-strain, due to errors of refraction, is often followed by such symptoms as headache, difficulty of thought concentration, nausea, and neuralgia, and even epileptic seizures have been proved to have their origin in an uncorrected astigmatism. These effects are especially accentuated in many women prior to, and during, menstruation. Naturally, they are more felt in the instance of a neurasthenic woman who is suffering from the dual trouble of the refractive error and some menstrual aberration. Hence we find them frequently present at puberty, during pregnancy, and in the climacteric. This association is specially worthy of the attention of the gynæcologist, as not infrequently disorders of the pelvic viscera are present.

In the chapters on 'Uterine Neuroses' sufficient evidence will be found of the concurrent occurrence of aberration of function in the generative organs with disturbance of the brain or cranial nerves.

At the annual meeting of the British Medical Association, 1895, I read a paper in the Ophthalmological Section on this subject, pointing out that in the unstable state of nervous

excitability or irritability, to which women suffering from pelvic disease are liable, there is a predisposition to central effects of possibly slight peripheral ailments. I then gave the particulars of fifty cases of women of various ages who consulted me within a comparatively short time, most of whom suffered from some form of pelvic disorder, and in whom the symptoms above referred to were present. Not one of these patients attributed any of the symptoms to a visual defect, yet in all there were varying degrees of astigmatism, in the great majority relief from the head symptoms following on the correction of the refraction by suitable lenses. A few cases are sufficient to illustrate the point I desire to emphasize—viz., that in women who suffer from such symptoms as headache, nausea, mental fatigue, and difficulty in concentration of thought, errors of refraction should be sought for as part of the general treatment of the case :

A young lady, aged twenty-two, a proficient musician, suffered from various local and other symptoms, which, upon examination, were found to be due to retroversion of the uterus. Attendant upon these was constant and severe headache. This, it was hoped, would disappear with the rectification of the displacement. As she had to leave home for some time, she was advised to see me, to ascertain whether the uterus was keeping its position, and as to the need for continuing to wear the support. This she did, complaining at the same time of the continuance of the very bad headaches, though she had recovered from her other local troubles. On examining the eyes, I found that she had myopic astigmatism, which had never been corrected, as she was wearing simple spherical glasses for all work. With −·75 cyl. added to her spherical lenses, this was completely corrected, and when last I saw her, her headaches had ceased.

Mrs. ——, aged forty-six, had suffered from severe headaches on and off for years. She was now in the menopause, with irregular catamenia. Her headaches had of late become much worse. Further than an enlarged uterus, with some tenderness, there was no pelvic trouble. She had never suspected her eyes as a cause of her headaches. Several teeth were carious ; these were removed. On examination, I found hyperopic astigmatism, which was completely corrected. When I last heard of her, about one month after wearing the glasses, her headaches had completely disappeared.

Mrs. H——, aged forty, consulted me for general ill-health, including metrorrhagia and other pelvic symptoms. She had as violent head pain as I have ever known of. All the teeth in the upper jaw, being carious, had been extracted for this latter symptom, without affording relief. She had a uterine cervical erosion and endometritis. She was cured of these latter troubles, but the head symptoms continued. On examination of the eyes, I found myopic astigmatism of the right, and hyperopic of the left eye : − 2·5 cyl. (vertical) in

the right eye, +0·25 spher. and +0·25 cyl. (horizontal) in the left eye, brought her to nearly $\frac{6}{6}$. She has been completely relieved. Careful attention in all cases was paid to any attendant asthenopia, and any errors of insufficiency were corrected by prisms.

Exploratory Incision.—Having exhausted all our means of diagnosis, and doubt still remaining, in a case of abdominal tumour, where the question of operation arises, there are yet abdominal incision and exploration. This step is not to be resorted to save as a *dernier ressort*, as in itself it is not devoid of danger. A small incision is made through the skin over the linea alba. The knife is carried on carefully through the cellular tissue, fat, tendinous structures, and subperitoneal tissue. All bleeding is arrested by torsion or ligature. The peritoneum is now examined. The shining wall of an ovarian cyst may be seen lying underneath. The peritoneum is next carefully raised by a tenaculum, or caught up in a fine forceps, and a small opening made which is enlarged on a director for the extent of an inch and a half to two inches. We are thus, with two fingers, enabled to examine an adjacent cyst-wall, search for adhesions, or explore the abdominal cavity.

Examination by the Rectum.—When the rectum has to be examined for fistulæ, fissures, ulcers, or hæmorrhoids, we may require a speculum (Fig. 87). The patient is placed on the couch, the nates are drawn well to the edge, and the thighs flexed. If any speculum should have to be employed, I prefer that of Gowland (Fig. 88), or the three-bladed one of Lane (Fig. 86). Whichever is used, we need a good light, and to introduce the speculum slowly and gently. This is very rarely necessary. The educated finger of the surgeon gives by far the most reliable information.

Some surgeons have taken advantage of a small Barnes hydrostatic dilator to dilate the uterus further after forcible dilatation or tents. For this purpose the bag may be fitted on a Higginson's syringe (Fig. 92).

The Urethra.—To explore the urethra, such an instrument as Bryant's conical dilator may be used, or the urethral speculum (Reeves). I prefer my uterine bougies as dilators, assisted,

after sufficient dilatation, by the finger. If nothing else be at hand, a small glove-stretcher answers admirably.

It is necessary in making a careful diagnosis in some cases first to empty the bladder and rectum. A continuous acting

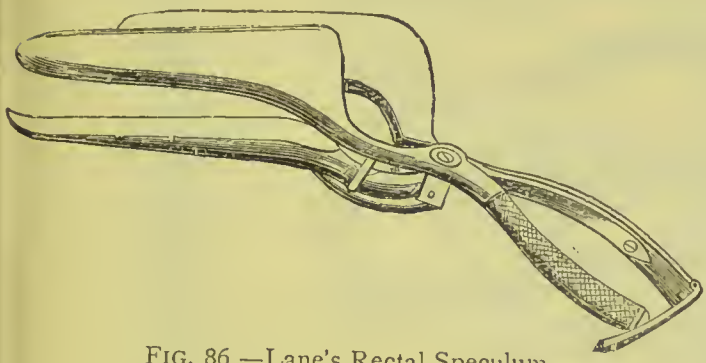


FIG. 86.—Lane's Rectal Speculum.

FIG. 87.—Rectal Speculum (Davy's).

FIG. 88.—Rectal Speculum (Gowland's).

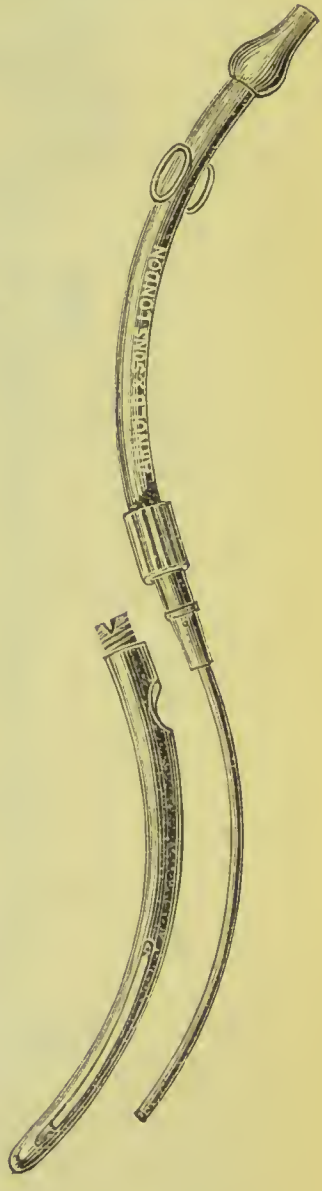


FIG. 89.—Bozeman's Uterine Catheter.

syringe is required for washing out the vagina.* Higginson's

* The 'Alpha' vaginal syringe (Stearns, New York) is an admirable instrument.

syringe answers for an enema. For use with the tubular speculum, after douching the vagina, or for holding a piece of cotton-wool, etc., the small vulcanite slice made by the same

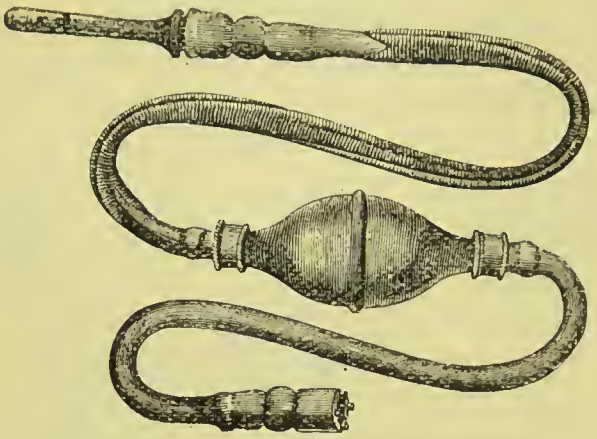


FIG. 90.—'Alpha' Vaginal Syringe. The vermicular outlet tube gives a continuous stream. It is a most useful syringe.

FIG. 91.—Soft Rubber Vaginal Pipe.

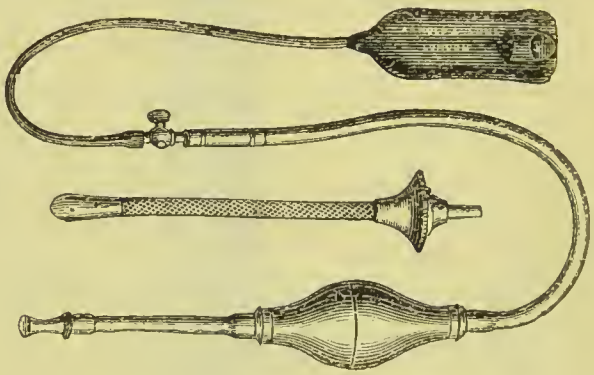


FIG. 92.—Arnold's combination of Barnes's Dilator and Higginson's Syringe.

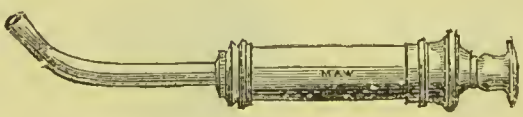


FIG. 93.—Rectal Syringe for injecting glycerine.

firm is convenient. I devised some years since a convenient slice that can be fixed on with a spring to the speculum, and which will be found most useful to carry away any fluid.

In operations on the vagina — Bozeman's and Simon's retractors are most convenient and useful instruments—the fenestrated retractors of Sims are sometimes to be preferred.

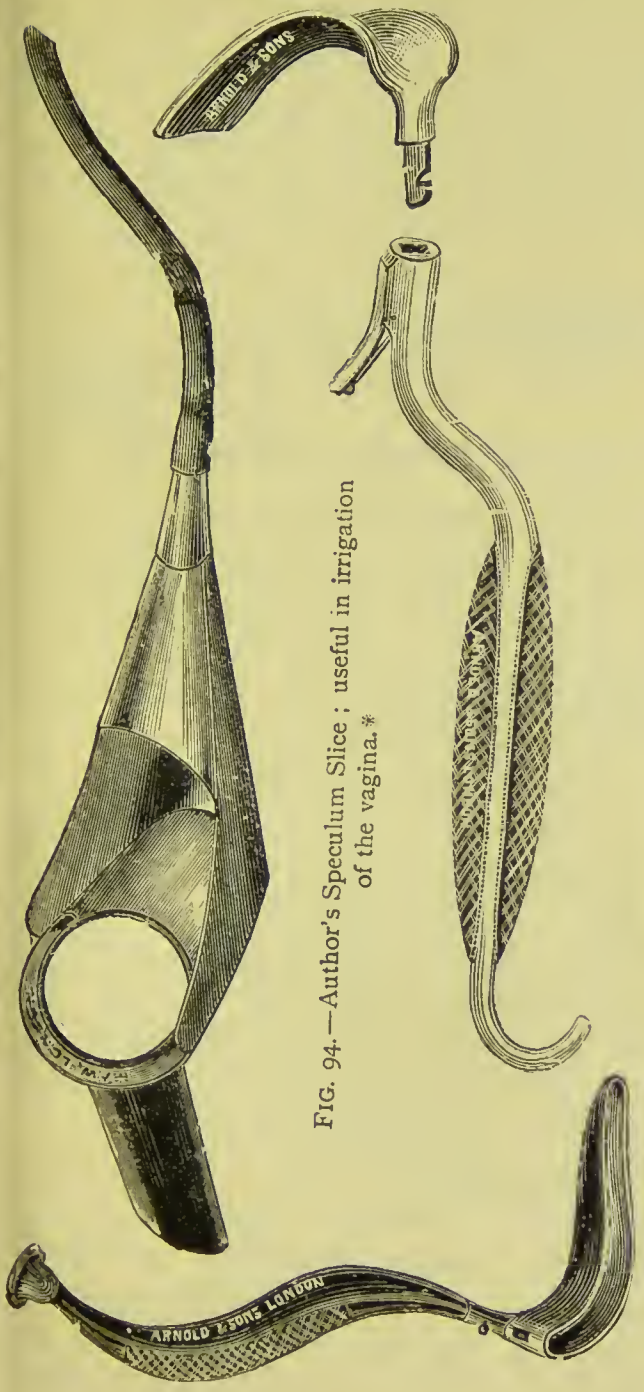


FIG. 94.—Author's Speculum Slice; useful in irrigation of the vagina.*

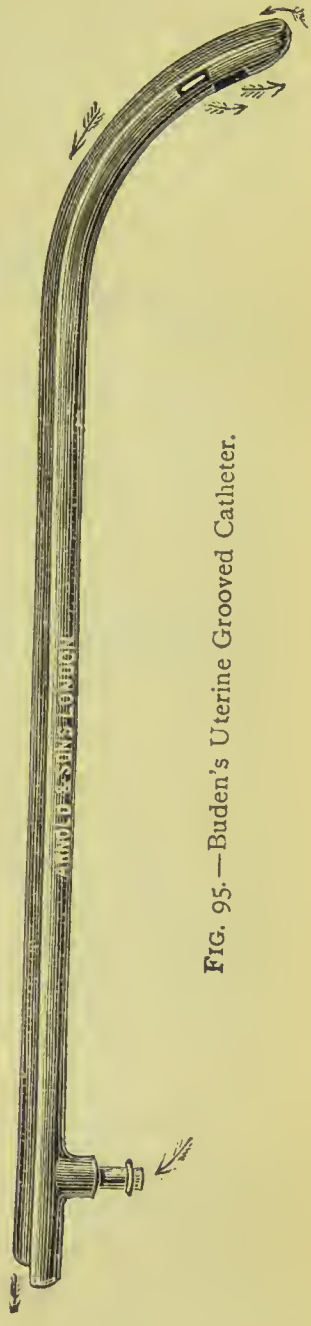


FIG. 95.—Buden's Uterine Grooved Catheter.

FIG. 96.—Bozeman's and Simon's Retractors.

* This irrigation speculum slice was first made at my suggestion in the year 1884. I find that the idea is credited, in the 'Annual of Universal Medical Sciences' for 1889, to Professor Pozzi.

CHAPTER IV.

SOME MINOR GYNÆCOLOGICAL OPERATIONS.

Applying Nitric Acid to the Cavity of the Uterus.—This is a simple step that any intelligent practitioner should be able to take in those chronic cases of endometritis and subinvolution which must occasionally come under his care. When efficiently carried out, it is one of the safest, as well as most satisfactory, of therapeutical measures.

It is an operative measure which should be avoided immediately before or after a period. It is well also in all operations on the uterus or ovaries to secure such mental rest and quiet as we can, and to subdue any morbid excitement of the nervous system generally. For this purpose a dose of twenty grains of bromide of ammonium or bromide of potassium may be given for some nights before operating. The secretions should be seen to, and the rectum if necessary emptied by an enema on the morning of any operative interference.

The uterine canal has been previously dilated. The patient is in bed. The instruments we require are — a duck-bill speculum, a few uterine wool-holders, an Atthill's trocar and cannula, and a uterine tractor. We have also the fuming nitric acid, vaseline, glycerine, and some absorbent cotton-wool at hand. It is indispensable to have an assistant or nurse when we use the duck-bill speculum.

The woman is placed in the semi-prone or lithotomy position, and brought well to the edge of the couch opposite a good

light. Sims' speculum is introduced, and the uterus is steadied and drawn well into view and under control. A thin layer of cotton-wool has previously been rolled tightly round one of the platinum probes to the extent of about two inches; the cannula is introduced by the aid of the trocar into the uterine cavity, and the trocar is then withdrawn. The cannula is easily

FIG. 97.—Exact size of holder covered with the wool.

FIG. 98.—Aluminium Wool-holder.

FIG. 99.—Roughened end of Wool-holder.

retained in position with a forceps. The probe is now dipped lightly in the acid, and it is a good plan to roll it on the side of the slice so as to press out any superfluous acid. It is then carried through the cannula to the fundus, and withdrawn

FIG. 100.—Atthill's Trocar and Cannula.

with the cannula so that the latter may protect the soft parts. The advantages of this convenient appliance of Lombe Atthill are manifest. If, however, the uterine canal be thoroughly

dilated and dried, its use may be dispensed with. The second of the uterine probes is ready charged with some vaseline, which it is well to pass after the acid has been applied to the fundus uteri. It helps to prevent adhesions. I place in the vagina either a tampon of dry absorbent wool or glycerine. Before passing the probe armed with the acid into the uterus, it is essential to completely arrest any bleeding that may have occurred. The same night the patient may take twenty grains of bromide of potassium or bromide of ammonium. She should remain in bed and have the vagina dressed each day; any discharge must be carefully wiped away, and a fresh tampon placed in the vagina. These same directions apply to the use of strong chromic acid solutions.

Depletion of the Cervix Uteri.—For this purpose the cervix uteri is exposed with a good-sized tubular speculum, the patient lying on her back. A Hall's lancet (a set of different sizes in a small case may be had) is taken, and some punctures,

FIG. 101.—Hall's Lancet.

according to the quantity of blood we require to take, are made in the cervix and the neighbourhood of the os uteri. A speculum slice is slipped under the lip of the speculum, and the blood is permitted to run into it. I believe rather in occasional depletion than in the abstraction of a large quantity of blood at one time. It is better not to make these punctures too freely.

I am aware of a case in which, having recommended depletion of the cervix, the incision was carried so deeply that the patient bled profusely before any assistance could be had, and dangerous syncope followed. In another case where the cervix was scarified at the house of the medical man—no precaution being subsequently taken—the patient, after her return home a little distance, had very smart bleeding, which naturally caused alarm to her and her friends.

When we judge that sufficient has been drawn, it is easy to stop any further loss by a plug of dry wool pressed up through the speculum against the cervix uteri. A few such tampons will arrest the bleeding. I make it a rule of practice to apply a few tampons of antiseptic wool after depletion. It is well to

LOS ANGELES

deplete, especially in cases of congestion and dysmenorrhœa, shortly before the advent of a period.

Aspiration.—When an aspirator is used for therapeutical purposes, I prefer the larger needles, as shown in Fig. 66. The aspirator I have been using for years, and which I have found most convenient, is that of Matthews (p. 72). The needle-points (Fig. 66) are protected after insertion by a

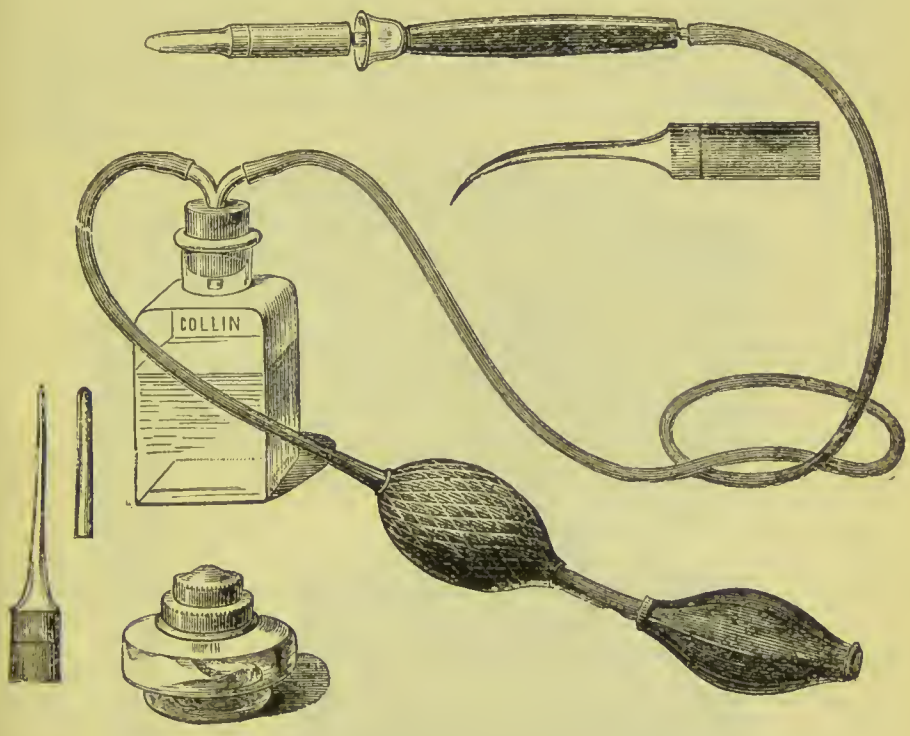


FIG. 102.—Paquelin's Thermo-Cautery.

cannula; the piston also completely prevents the admission of air.

The Actual Cautery.—When for any purpose we desire to employ the actual cautery, there is no appliance to surpass for general use the benzoline cautery of Paquelin. It is available also for cutting purposes, growths, small tumours, vascular excrescences, malignant disease of the uterus, perforation of a fibroid tumour of the uterus, and hæmorrhoids. For very small tumours and for operation on the urethra, the galvano-cautery answers admirably. Fine platinum points can be obtained of

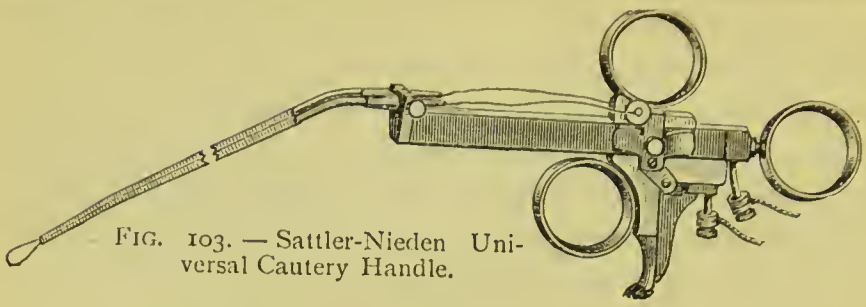


FIG. 103. — Sattler-Nieden Universal Cautery Handle.

FIG. 104.—Cylindrical Cautery Handle for fine cauteries.

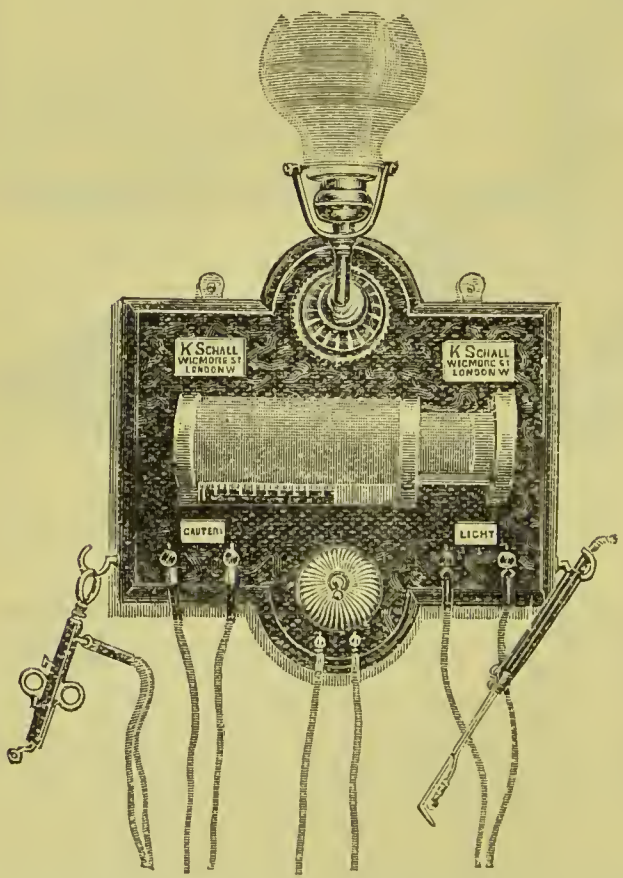


FIG. 105.—Electric Transformer for light and cautery. Supplied by all electrical firms. It is connected with the main.

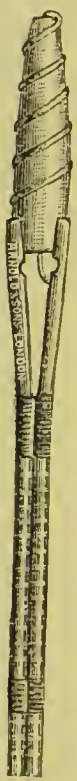


FIG. 106.—Porcelain Cautery.

any shape. All instrument-makers now furnish portable cautery batteries. Porcelain cautery points can also be had if required.

Incision of the Cervix Uteri.—Simple incision of the lower part of the cervix has frequently to be resorted to. It is of advantage in cases of endocervicitis, when we have a small os externum in which we require room for intra-uterine medication; also in those cases of congestive and mechanical dysmenorrhœa associated with conical cervix and pinhole orifice. The incision is best performed with a Kuchenmeister's scissors (Fig. 108), the intra-uterine blade of which is introduced to the

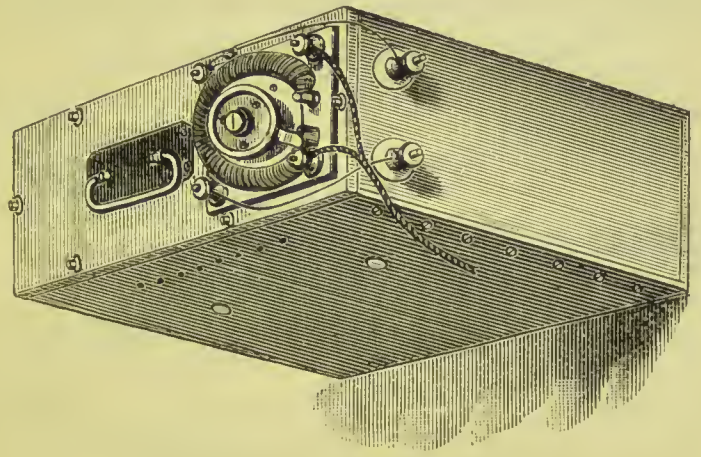


FIG. 107.—Cautery Battery (Accumulator), with Rheostat, to control the amount of heat (Coxeter).

desired extent into the canal of the cervix, and, either bilaterally or through the posterior wall, the cervix is divided. It must be remembered that even with this simple step it is necessary to adopt every precaution. Therefore, before performing it the patient should be told that she must remain quiet and stay in bed for a day or so after the operation. She should run no risk from cold or coitus. (For particulars of the operation on the internal os, see p. 116.)

A nightly dose of bromide of ammonium may be administered, commencing about five days after a period, and continued for a few nights. The rectum is cleared before operation. The operator ought not to have had contact with any case of infectious disease for some days beforehand. Sims' or

the dorsal lithotomy position is chosen; the uterus is drawn well into view and held by a hook. The operator sees thoroughly how far he is cutting, and the extent of introduction of the blade. After division, bleeding is carefully arrested. I think it well, as a rule, to avoid the use of perchloride of iron. The bleeding is generally controlled by a few dry plugs, pushed well against the wound, or a little pad of styptic wool is carried up and pressed into the incision, and allowed to remain. After the bleeding has ceased, a plug of antiseptic wool soaked in glycerine is left in the vagina. The vagina must be dressed once daily, and the wound kept open with a uterine probe. A

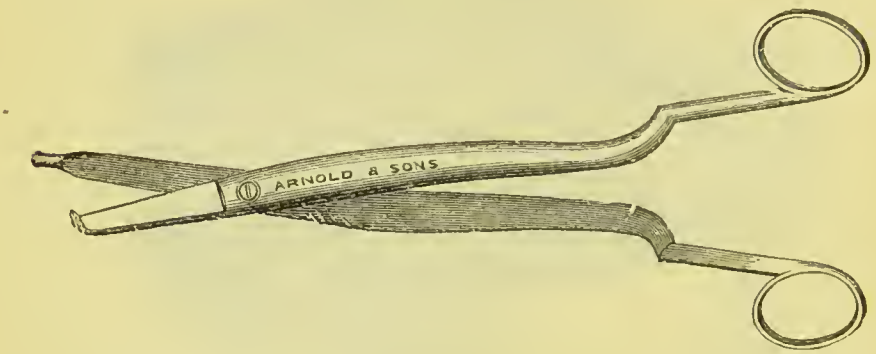


FIG. 108.—Kuchenmeister's Scissors.

glass or celluloid-wire stem (made for me by Messrs. Arnold) is worn in the uterus.

DIVISION OF THE CERVIX UTERI AND INTERNAL OS.—In cases of sterility where dilatation has failed, in severe endometritis with dysmenorrhœa, and in spasmodic dysmenorrhœa, division of the cervix uteri and internal os is indicated. This is a much more serious, as it is a far more efficacious, step, than division of the cervix alone. We are more likely to have hæmorrhage from the uterine vessels; we are closer to the peritoneum; there is a greater risk of metritis, and there is more immediate shock to the woman. Every precaution taken in the simpler operation is adopted in this. The instrument I prefer is a Sims' knife. The blunt-pointed, straight, and curved blades are carried in the handle. They can be adjusted at

any angle to the long axis of the handle. The preliminary steps are those taken for division of the cervix. The knife is passed through the cervix uteri and internal os. The incisions are carried laterally or posteriorly. The posterior incision,

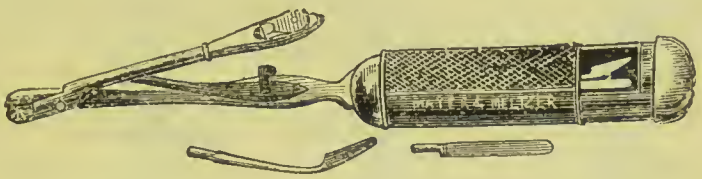


FIG. 109.—Marion Sims' Knife for division of the Cervix. Two straight and two curved knives are carried in the hollow handle as shown.

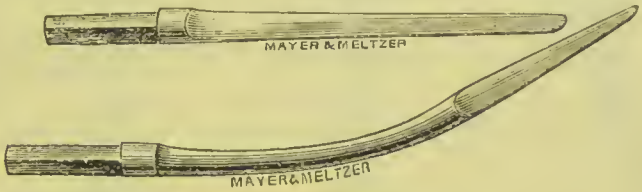


FIG. 110.—Blades (natural size).

with the exsection, as suggested by Sims, of a small triangular portion of the neck of the uterus, has the great advantage that it places the axis of the patient's uterine canal in the most favourable position for conception. This is still more apparent if there be an anteflexion associated with the sterility.

FIG. 111.—Author's Celluloid-wire Stem (*Arnold*).
This can be moulded to any shape, and by means of a loop of Chinese silk passed through a hole in the short handle of the stem it can be readily withdrawn by the nurse or patient herself.

Soft self-retaining rubber and perforated vulcanite stems, as devised by Greenhalgh, can be obtained. They are made by Arnold. I do not use them, nor approve of their employment. No precaution must be omitted, after incising the cervix, against exertion, cold, coitus, or septic contagion. It is better

to keep the canal open with one of the stems suggested in the last section.

I do not in this edition figure Greenhalgh's and Simpson's metrotomes. I have the same strong objection to them as to all metrotomes constructed on similar principles, namely, that the action of the blade is not so directly under the control of the operator, nor the extent and direction of the incision made by it, as with such an instrument as the knife of Sims.

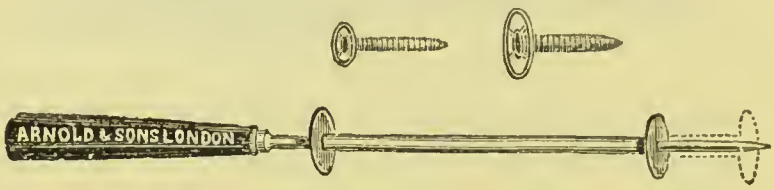


FIG. 112.—Intra-uterine Stem of Duke.

PARACENTESIS ABDOMINIS.—This is an operative measure called for—

(*a*) For purposes of diagnosis (ambiguous cases);
(*b*) Where the operation of ovariotomy is contra-indicated to prolong life;
(*c*) As a palliative measure, to gain time in certain cases, and to afford temporary relief;
(*d*) In some cases where pregnancy or ascites complicates ovarian dropsy.

It is not a step to be undertaken lightly. It has to be remembered that simple tapping of an ovarian cyst has been frequently followed by death from shock, peritonitis, the escape of cyst contents, or blood escaping into the peritoneal cavity, and septicæmia. Therefore it is well, in preparing to tap, that we should decide beforehand clearly with what object the step is taken. Rarely is it justified in ovarian cystoma. If our desire be to assist the diagnosis, then I prefer the aspirator and one of the larger needles (Fig. 66). The rod in the needle prevents the admission of air. Such a needle will possibly empty even a large cyst. If we have a doubt as to the nature of the fluid, while, at the same time, we are anxious to tap the cyst, the trocar of Spencer Wells is an admirable instrument

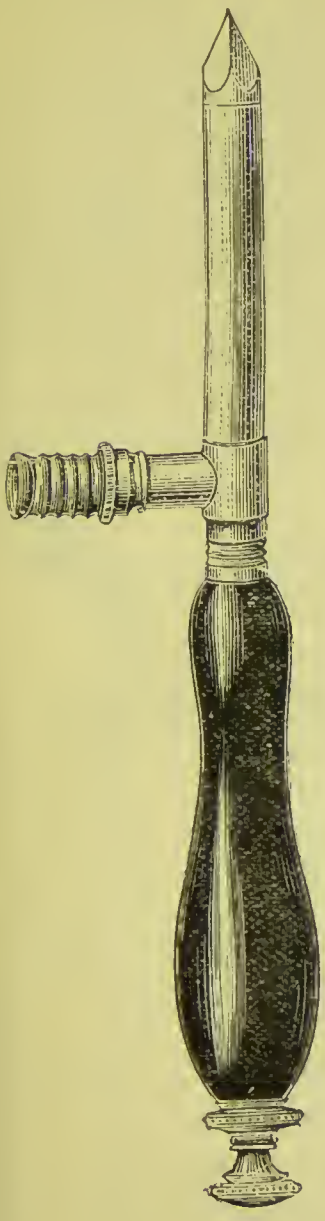


FIG. 113.—Wells' Trocar.

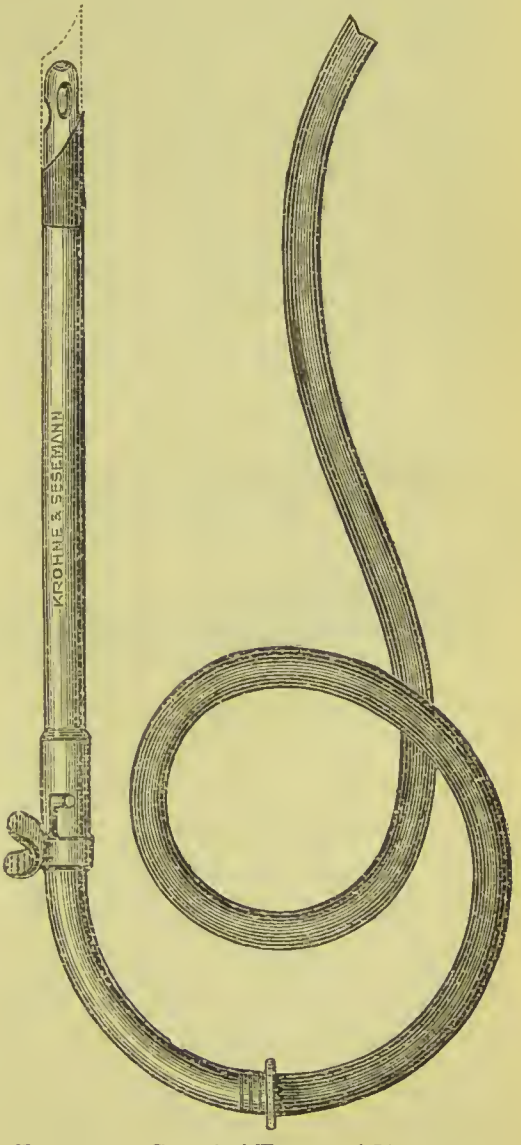


FIG. 114.—Guarded Trocar of Sir Spencer Wells.

(Fig. 113). The larger the bore of the trocar, the safer it is in all such cases. One of the most awkward accidents of paracentesis is the clogging of the tube with semi-solid material, and the escape of cystic fluid as a consequence into the

peritoneal cavity. Having decided to tap, we prepare our patient by attention to the secretions, giving a dose of bromide of potassium on the night previous to the operation. Immediately before it the urine is drawn off by an assistant. Save to allay nervousness, an anæsthetic is not necessary, and is better avoided. Chlorethyl spray, or, if this be not at hand, anæsthetic ether sprayed on the site of the small preliminary incision, or, as Goodell advises, the application of a lump of ice, the end of which has been dipped in a little salt, will deaden the sensibility. It is better, if possible, to select the linea alba. It is the exception when we are compelled to make the puncture elsewhere, through the accident of some

FIG. 115.—Bengué's Bottle of Chlorethyl for producing instantaneous local anæsthesia.
The heat of the hand expels the spray.

solid matter occupying the position of the median line. The abdomen may be first embraced in a split roller. This is drawn tighter as the fluid escapes, and it serves to support the abdominal wall during the emptying of the sac and the removal of the pressure from the great vessels. The woman is brought well to the edge of the bed, the abdomen projecting over it. A bucket with a little water in is at hand to receive the contents of the cyst, so that the end of the tube attached to the trocar may dip below the surface, and thus the admission of air be prevented. A small incision is now made over the linea alba, in the abdominal integument, midway between the pubes and umbilicus, and the trocar is plunged into the cyst. If it be a polycyst, the trocar may be made to pierce the other cysts without withdrawal. When the fluid has ceased running, extra

caution must be exercised in preventing the admission of air, or any fluid likely to excite inflammation.

The wound is closed with dry antiseptic dressing. If the incision should have been made too large, a silver-wire suture must be inserted; otherwise, a dossil of lint and a few straps of adhesive plaster are sufficient. The prepared thymol or iodoform pads will be found most convenient to lay over the wound after all such operations. The same care should be exercised to anticipate peritoneal inflammation after paracentesis as after the more formidable operations of abdominal section.

*Vaginal Punction.**—In a limited number of cases, it may be necessary to remove fluid from a cyst, ovarian or other, by the vagina. A small cyst may be localized in the pelvis, occupying Douglas' space. In a multilocular cyst the solid part may be above, and the fluid cysts distend the lower portion of the tumour. For diagnosis it is necessary to explore when we are uncertain of the nature of the swelling, whether ovarian or tubal. *All the dangers of peritonitis and septicæmia are accentuated in vaginal tappings.* It is preferable, as a rule, to use an aspirator; otherwise, a long curved rectal trocar, or, still better, the small guarded ovarian trocar of Spencer Wells, must be chosen, with a tube attached, the lower end of which can pass into some fluid in a vessel at the side of the bed. The patient is best placed in the lithotomy position. The rectum and bladder (as in all operative procedures on the pelvic viscera) are first emptied. A careful and final exploration of the pelvic organs is made. The most prominent part of the tumour is felt, where we find the most distinct sense of fluctuation, and the trocar is guided to this spot by the middle and index fingers of the left hand. The bulging portion is now pierced with the trocar, which is then withdrawn, and the fluid is permitted to flow off by the cannula and tube. There should be no meddling after the withdrawal of the fluid. The vagina may be washed out at intervals with some disinfectant solution, and an antiseptic tampon worn. The greatest care is necessary

* Consult chapter on Perimetritis and Pelvic Suppuration.

for several days, the patient being kept on her back and the pulse and temperature closely watched. The bladder must be regularly relieved by the catheter, and it is well to keep the bowel quiet by opiates for a few days.

All that has been said of paracentesis 'per vaginam' applies to the relief of a pelvic hæmatocele by aspiration or tapping. *It is right to insist on the comparative danger of this step.* Two facts must always be before the mind of the surgeon in deciding to puncture a peritoneal hæmatocele. First, we open into the peritoneal cavity, and we admit air into a fluid prone to decomposition; hence we expose our patient to the increased risk of septicæmia. Secondly, it has to be seriously considered if we increase the chances of recovery. Much must depend on the source and situation of the hæmatocele. My individual experience of all cases of hæmorrhage arising from various causes would incline me rather to say, 'If it be not a case for cœliotomy, let it alone.'*

I attended a lady in consultation with Dr. Threadgale, in whom a huge hæmatocele was completely absorbed, the upper limit of which at one time reached nearly to the umbilicus. The treatment mainly consisted in the application of Leiter's iced abdominal irrigator to the abdomen, hot antiseptic douches (hydrarg. perchloride) per vaginam, and the internal administration of hydrastia with ergotine and lupulin. For some time abdominal section was thought of, or puncture; but as the patient seemed to progress favourably under the treatment, there was no interference, and the result was a complete recovery.

If it be decided to puncture, or to remove clots, either from the quantity of fluid in the tumour or the symptoms of septicæmia being imminent, we must determine our site of puncture according to the character of the swelling and the situation of its most prominent surface. As a general rule, the posterior cul-de-sac of the vagina will be found the most suitable and convenient place to puncture. The aspirator is the best instrument to use. If we be deceived in the sense of fluctuation, and find either a smaller quantity of fluid than we anticipated, or only softened clots—or that no fluid comes with the aspirator—the question immediately arises, Should we lay open the mass and remove the clots? The decision must

* Consult chapter on Pelvic Hæmorrhage.

depend on the urgency of the local or general symptoms—great pelvic distress in the bladder and rectum on the one hand, symptoms of septicæmia on the other. It is impossible to lay down dogmatic rules for guidance in such cases. Each individual case has its special peculiarities and bearings. The

FIG. 116.—Bistoury.

frequency with which tubal pregnancy is found to be the cause of the effusion has to be always remembered. Abdominal section is here the clear indication. Influenced by surgical instinct and experience, we must do all that is possible to save our patient, avoiding unjustifiable or rash risk in the one direction, and equally culpable and timid trifling with life in the

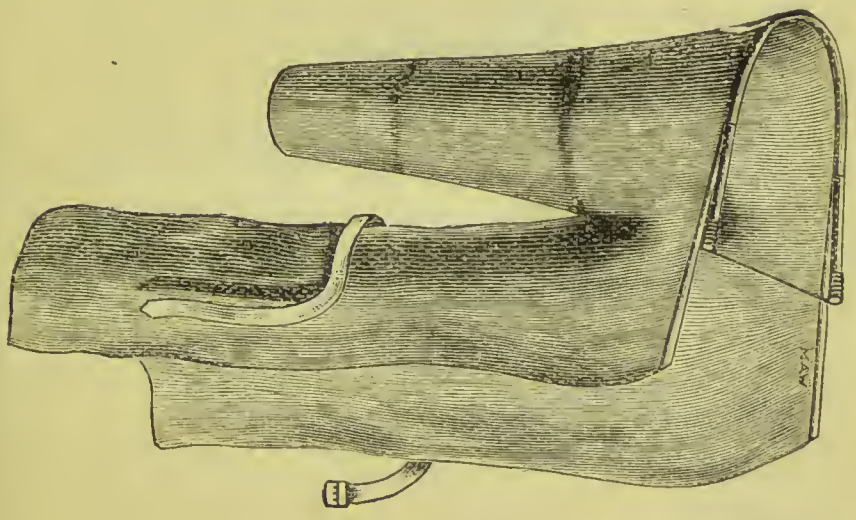


FIG. 117.—Jessett's Waterproof Funnel, with sheet to protect the patient during irrigation.

other. Should we resolve to open the mass, a long bistoury may be taken (if we have not Paquelin's galvanic knife to hand), and a little lint is wrapped round the blade, as a sheath, to within about one inch of the point. Such a knife as that figured will be found most suitable. The incision is carried through the posterior vaginal roof, and is of sufficient extent to

admit of one or two fingers to examine for clots, and remove these if necessary. A long dressing forceps can be introduced, or a dilator through the small opening made, and this is enlarged by separating the blades to a desirable distance. Or a branched steel dilator can be used. It is needless to say that this step must be conducted with the strictest antiseptic

FIG. 118.—Smester's Funnel for Vaginal Injections (Pozzi).

precautions. The vagina should be washed out with a carbolic or bichloride of mercury solution before operating. After the evacuation of the contents of the tumour an antiseptic fluid is used, through a piece of tubing attached to the nozzle of an ordinary syringe or the cannula of the aspirator. Hydro-naphthol solution (1 in 2,000) is a valuable antiseptic solution. Iodoform gauze is placed in the vagina subsequently.

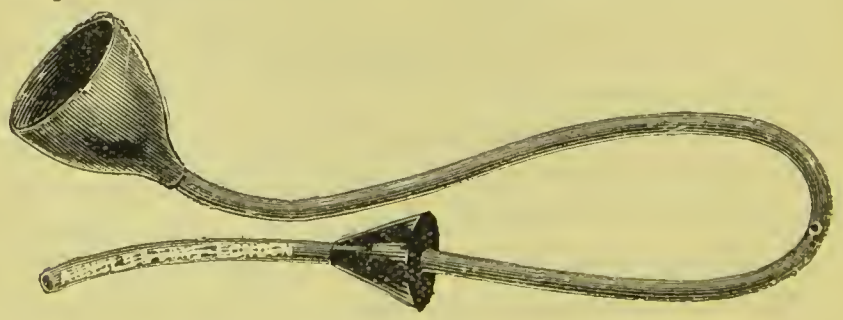


FIG. 119.—Syphon Rectal Feeding Tube.

CHAPTER V.

SOME MINOR GYNÆCOLOGICAL OPERATIONS (continued).

Intra-uterine Medication.—In gynæcological practice the treatment of uterine discharges by the topical application of agents to the uterine canal, both of cervix and body, is of everyday occurrence. In the commonly occurring troubles—subinvolution, endometritis (cervical and corporeal), granular and follicular conditions of the canal after removal of polypi, those conditions consequent upon gonorrhœa—we have to apply caustics, astringents, and absorbents, or the curette, to the interior of the uterus. The following are some of the more important therapeutic agents employed:

Nitric acid.
Carbolic acid.
Chromic acid (in solution).
Iodoform (in ointment) and iodol.
Iodine (as tincture or with glycerine).
Ichthyol, 10 to 20 per cent. solution.
Iodine and carbolic acid.
Nitrate of silver (solid and in solution).
Sulphate of zinc (solid and in solution).
Perchloride of iron (in solution).
Chloro-acetic acid (in solution).
Chloride of zinc (in solution).
Mercury (in ointment).
Belladonna (in ointment).
Morphia (in ointment).
Hydrastis Canadensis (extract).
Hazeline (liquid extract).

I have found the liquid extract of hydrastis, either alone or diluted, and combined with glycerine, carbolic acid, or tincture

of iodine, an admirable application in cases of cervicitis and erosion of the cervix. I can say the same of ichthyol.

Intra-uterine medication is thus carried into practice either through the medium of solid substances, the introduction of ointments, or the application and injection of liquids. These are applied to the cervix alone, or to the cavity of the body of the uterus above the cervix.

While many women are insusceptible to the effects of intra-uterine applications, others, on the contrary, are very easily affected by such, and are peculiarly prone to suffer from uterine colic, symptoms of collapse, metritis, or peritonitis, after their use. Intra-uterine medication, then, is always to be undertaken cautiously. Before resorting to it, the woman must be placed in the best possible position to undergo this form of treatment. This caution is all the more necessary in the instance of those applications which are made above the os internum. Certain general precautions are applicable to all cases. I may categorically state these in the form of general rules of treatment.

General Precautions.

Reduce any general congestion of the womb by such therapeutic means as baths and depletion, before commencing intra-uterine treatment. Let the vagina be cleansed by antiseptic injections. Have the patient's bowels attended to by the administration of some saline purgatives; rest in bed is essential where a powerful agent is carried beyond the isthmus uteri. In all cases of narrow and contracted os uteri, it is well to enlarge it by lateral incision before we apply any substance internally. If we have to attack the cavity of the body, sufficient patency of the isthmus uteri should be secured before we proceed to treatment. In all cases of intra-uterine medication, when any caustic or astringent has been used, an antiseptic tampon should be placed in the vagina. This is the more requisite if the step be taken in the practitioner's house, and if the patient will have to drive or walk any distance subse-

quently. No application should be made *immediately* before or after a menstrual period. The safest, most convenient and effectual means of applying any remedy to the canal of the uterus is by means of the uterine cotton-wool holder. The probe can be curved to any shape, so as to pass readily into the uterus. It is well to have two probes by the surgeon; one is necessary to clean out the uterus. This is readily done by rolling a layer of cotton-wool tightly round the end of the probe, and wiping out the uterus with it. At times a difficulty is experienced in removing the tenacious plug that fills the cervix in some cases of endometritis. By placing a little more wool on the probe, and rotating, we may detach this; but a small conical sponge, held in a miniature sponge-holder, will answer the purpose better than anything I know of.

When about to dress the uterus in the manner spoken of, it is well to have the patient in front of a good light on the obstetric couch, in one of the positions already described. The dorsal decubitus will be found generally the most convenient. I have already alluded to the mode of applying nitric acid to the fundus uteri. In all these cases where we have any difficulty in reaching the cavity of the fundus, it is far better to use the duck-bill speculum. One tampon of wool is ready at hand, and some half-dozen small pieces are prepared to wipe the vaginal roof and surface of the uterus. The cervical canal is cleaned out and dried, and the uterine probe, armed with the cotton-wool saturated with the solution, is carried the desired length into the uterus. When the probe is withdrawn, the vaginal tampon is introduced.

Of the substances named, the strength of any solution selected must depend on the character of the case and the effect we desire to produce. The safest rule for surgeons to follow is to select a medium strength of any medicament, and never to begin with the maximum of that recommended. On the whole, it is better to be below than above even the medium strength of some solutions. The subjoined are those that, as a rule, will be found safe and serviceable:

1. Nitric acid (applied as directed), pure.
2. Carbolic acid and glycerine two parts to one, and equal parts. (Extract of hydrastis, one part, may be added.)
3. Carbolic acid, glycerine, and tincture of iodine: equal parts, or combined with extract of hydrastis.
4. Carbolic acid and ext. hamamelis (liq.): equal parts.
5. Chromic acid: gr. xx.—xxx. ad ʒi.; or the same solution with equal parts of glycerine.
6. Iodine: gr. xxx.; spt. rectif., ad ʒi.; or tincture, with equal parts of glycerine.
7. Nitrate of silver: gr. xx.—xxx. ad ʒi.
8. Perchloride of iron: gr. xx.—xxx. ad ʒi. (glycerine or water), with one part of No. 2 Solution.
9. Sulphate of zinc: gr. xxx. ad ʒi.; or with one part of No. 2 Solution.
10. Chloride of zinc; gr. xxx. ad ʒi.; or with one part of No. 2 Solution.
11. Ichthyol solution in rectified spirit and glycerine, 10 to 20 per cent.

These solutions will be found to answer for most cases. It is a good plan in periodical dressings to vary the nature of the application. A desired effect will often follow this change in the substance we apply.

Intra-uterine Injection.—I never resort to intra-uterine medicated injections into the cavity of the uterus. I do not care to run the unquestionable risks attendant upon their employment. *The less fluid we leave in the uterine cavity after any topical application, the better.* This applies with double force to the undilated organ; in it metritis, peritonitis, collapse, colic, cellulitis, and perimetritis are more likely to follow the injection of fluids. If they be used, it should be with such an instrument as the urethral injector of Sir Henry Thompson, which I have for years successfully employed in gleety states of the male urethra. Such an intra-uterine medicator I had made for me by Messrs. Maw (Fig. 124). It has a uterine

curve, and answers well for introducing fluids. It contains a sponge, moistened with the solution, which is carried down to the apertures in the curve of the instrument, and thus a small quantity can be squeezed through these into the urethral or uterine canal. Withdrawing the sponge slightly, we can permit the reflux of any fluid that may remain, before removing the instrument. Still, the advantage we gain by this over the application with the uterine probe and saturated wool, I confess I am at a loss to see. If intra-uterine injections be used, we must be careful to—

(1) exclude the possibility of any flexion of the canal;
(2) secure free exit for any fluid by previous dilatation of the canal;
(3) inject (the patient being in bed) within a week *after* the menstrual period, and take every possible precaution to anticipate and prevent *subsequent* inflammation;
(4) avoid the admission of air;
(5) never use nitrate of silver solution by injection;
(6) first wash out the uterus with a little warm water, to ascertain the uterine sensitiveness.

Tincture of iodine, diluted; carbolic acid, with glycerine and water; perchloride of iron, in water; chromic acid, in solution; sulphate and chloride of zinc, in water—have all been used. The strengths should be weaker than those we employ of the same agents with the cotton-wool and probe.

A fairly safe injector to use is a small glass syringe which fits accurately to a hollow uterine sound with fine apertures at the point (Figs. 120-122). Whatever fluid is employed, at the most, only five to ten drops should be injected at the time. *I repeat that in practice I believe intra-uterine injection to be a needlessly venturesome plan of treating unhealthy endometric conditions.*

Ointments.—Any ointment of such strength as we may desire can be applied to the cavity of the uterus. Thus we may use ichthyol, carbolic acid, chromic acid, nitrate of silver, iodoform, nitrate and iodide of mercury, belladonna, bismuth, tannic acid, morphia, acetate of lead. We may apply it with the

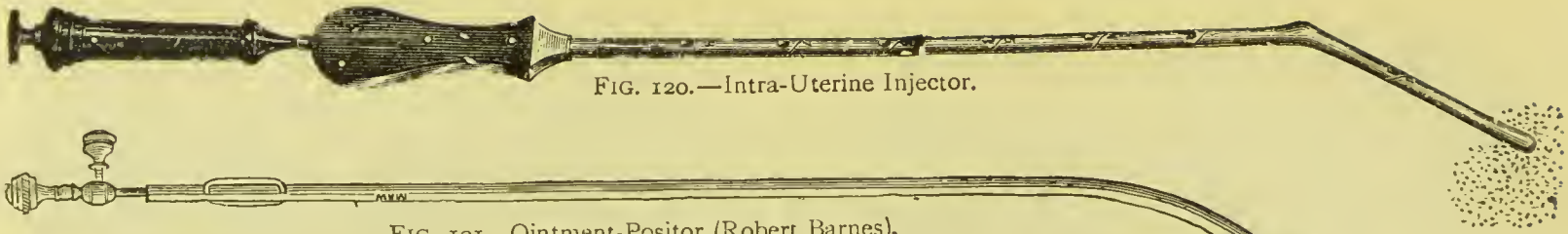


FIG. 120.—Intra-Uterine Injector.

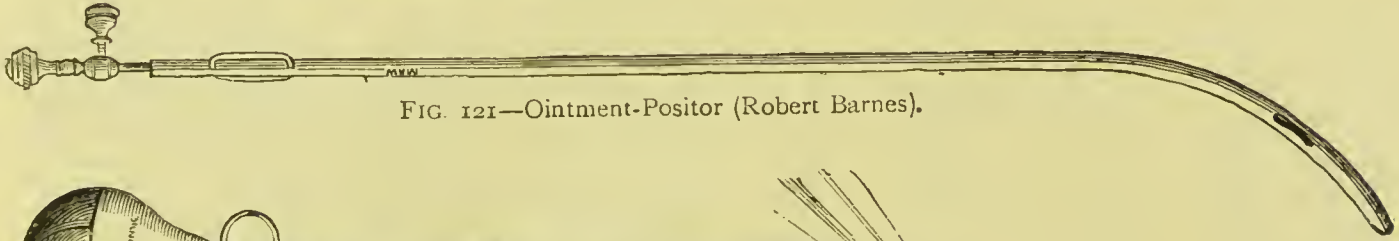


FIG. 121—Ointment-Positor (Robert Barnes).

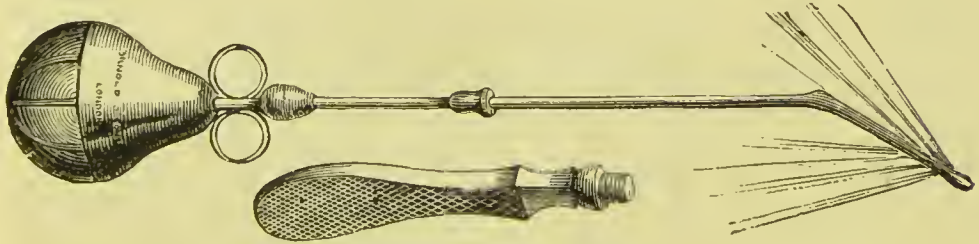


FIG. 122.—Intra-Uterine Injector.

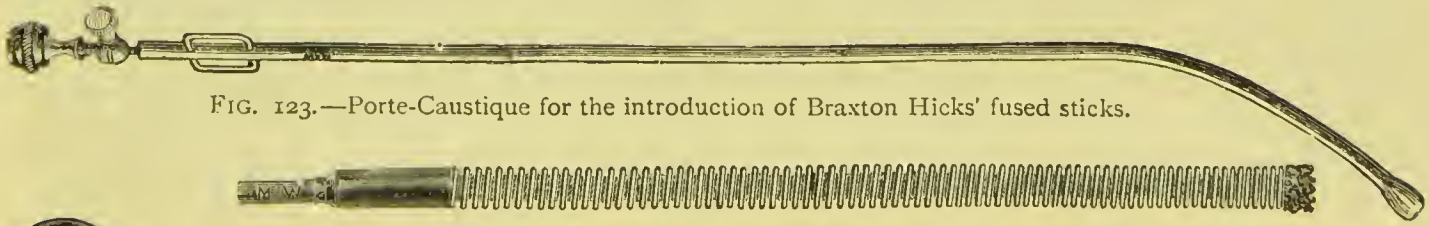


FIG. 123.—Porte-Caustique for the introduction of Braxton Hicks' fused sticks.

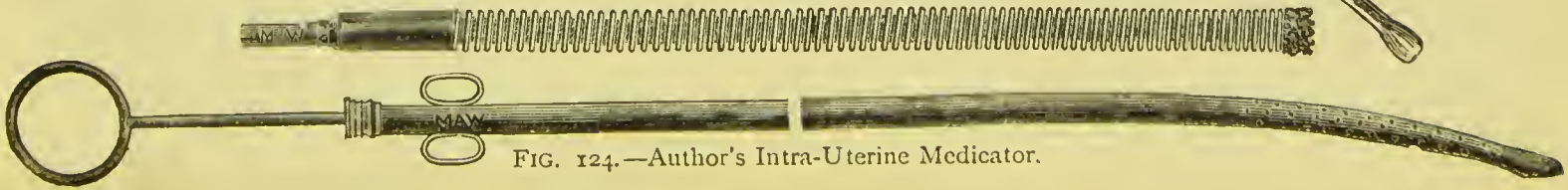


FIG. 124.—Author's Intra-Uterine Medicator.

uterine probe, or with such an appliance as the ointment-positor of Robert Barnes (Fig. 121). Lanolated fat with 'paroleine' oil is a good basis for ointments.

Solid Substances.—These are best used in the shape of the fused sticks sold for the purpose—as those of Braxton Hicks, which are made of sulphate of zinc. Though I have almost altogether abandoned the use of such sticks, I have never known any ill effects follow their application. We can with the porte-caustique (Fig. 123) introduce bougies of iodol, iodoform, cocaine, belladonna, iodide of mercury, and europhene. Nitrate of silver is used in combination with nitrate of potash made into small moulds, or it may be readily fused in a little platinum crucible, and applied on the point of a uterine probe. Many years since, Lombe Atthill advocated intra-uterine application of the solid nitrate of silver in sub-involution of the womb, attended by severe menorrhagia, regarding it as 'both simple and safe.' These substances are applied through the porte-caustique (Fig. 123), a hollow uterine sound open at the end. The little caustic stick is inserted into this, and pushed home into the uterus by the stylet, which fits the tube accurately. But we must be careful to withdraw the porte-caustique a little from the uterus when pushing in the stick, so as not to penetrate the uterine wall.

FIG. 125.—Small Platinum Crucible for fusing nitrate of silver.

Intra-uterine Suppositories.—I have occasionally found benefit from very small suppositories (which can be readily had to order of any good chemist) made of cacao-butter and glycerine containing belladonna (gr. ii. of extract), morphia (gr. $\frac{1}{4}$—$\frac{1}{2}$), carbolic acid (gr. ii.), iodoform (gr. iii.), tannic acid (gr. x.), and alum (gr. x.); these agents may be used either singly or in combination. To these we may add cocaine (gr. ii.).* They can be inserted through the porte-caustique. I do not, how-

* Eucaine may be substituted for cocaine.

ever, care to introduce unctuous or greasy substances into the uterine cavity. I can only repeat that I believe the safest, the most generally convenient, and the most efficacious means of treating abnormal states of the endometrium, short of curettage, is by the aid of the uterine cotton-wool-holder.

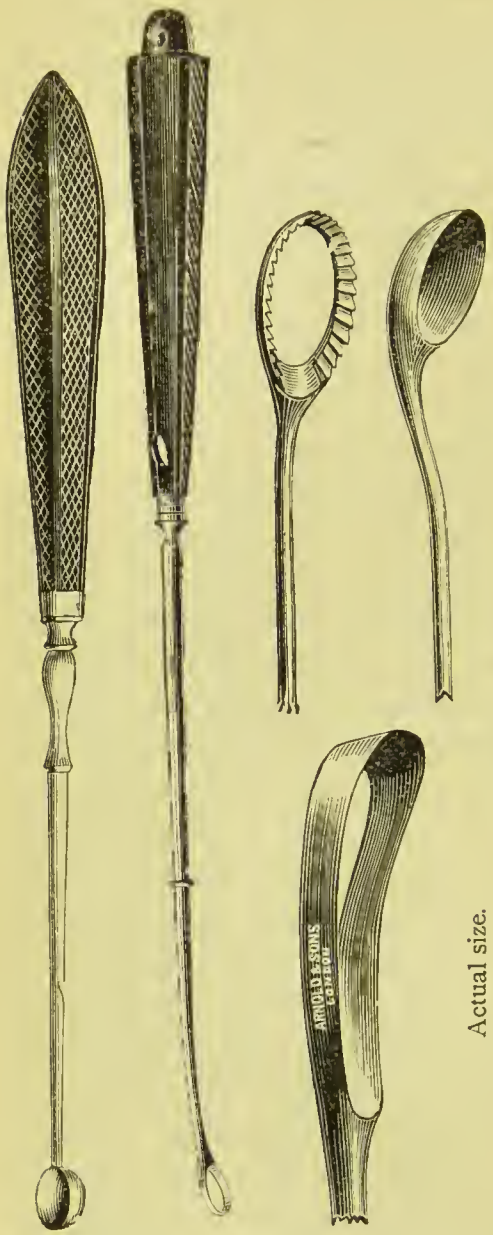
Potassa Fusa and Potassa Calce.—Both these caustics, the former being the more deliquescent and powerful, are by some surgeons employed in certain cases of granular cervix, chronic hyperplasia, and malignant disease of the uterus. They are very severe in their action, and require to be used with considerable caution. Their effects in causing contraction of the uterine tissue, or, if incautiously used, obliteration of the os, as also the danger to the surrounding vaginal membrane, are to be remembered. They are thus applied: The patient is placed in the dorsal position, with the legs drawn up and held apart. A large-sized Fergusson's speculum is introduced, and the cervix brought well within the tube. Some absorbent cotton-wool, saturated with vinegar, is packed round the lower part of the cervix, separating the rim of the speculum from the part to which the caustic has to be applied. The pencil of caustic is now taken in the holder, and used lightly or otherwise, according to the desired object. The more freely it is rubbed on, the greater the depth of tissue destroyed, and the larger the slough. A stream of vinegar and water is then directed on the part, the wool having been removed. A pledget of cotton-wool, soaked in equal parts of vinegar, glycerine, and water, is now pushed up against the cervix, and allowed to remain in the vagina. Uterine pain after any form of medication is best relieved by a subcutaneous injection of morphia, and a belladonna and morphia suppository introduced into the vagina. At night, to secure rest, the ordinary combination of gr. xxx. of bromide of ammonium or potassium, with gr. xx. of chloral, is one of the best I know of.

[The method of applying chloride of zinc in solution or paste is described in the chapter dealing with the treatment of malignant disease of the uterus.]

The Use of the Uterine Curette.—The value of curettage of

the uterus as a therapeutical step in diseased conditions of the endometrium cannot be too strongly insisted on. In chronic endometritis, which has resisted other means of cure, in the case of fungosities of the cavity of the body, in granular endo-cervical conditions, in the instance of small mucous polypi attendant upon follicular degeneration of the endometrium, for placental polypi and the granulations which remain after adhesions following discharge of the ovum, in the case of soft growths which we are apprehensive are of a malignant nature, the use of the curette is indicated. Many of these states are attended with persistent or recurring hæmorrhage.

The Operation.—It is well before employing this mode of treatment to prepare the patient by a few days' preliminary rest in bed, with attention to the bowels, and the use of antiseptic vaginal douches. Previous to curetting, the uterine isthmus is well dilated, and the patient placed under an anæsthetic. It is advisable to have several curettes of different sizes, shapes, and edges, so that we may select the one suitable to that portion of the canal on which we are operating, and the resistance of the tissues at the spot. The dorso-sacral position is the best to adopt. The duck-bill speculum is used, and the uterus is drawn down and fixed by a vulsellum, or two uterine hooks. Some hot perchloride solution (1 in 5,000) is ready to hand, with several sponge-holders, charged with cotton-wool, rolled and secured in egg-fashion around the ends. If the uterus should have been dilated with tents, every care is taken (see remarks on dilatation) to thoroughly cleanse the vagina and the uterine cavity. During the use of the instrument, such force should not be used that, if there be considerable softness of the uterine tissues, they might run the risk of being perforated. In cases of extreme flexion, or of prolonged metritis, the degree of thickness of the mucous membrane is increased. In fact, the size and form of the curette must depend on the nature of the surface and degree of resistance of the tissues, as well as the magnitude of the growths we are desirous of removing. When the uterine degeneration is soft



Actual size.

FIG. 126.—Various Uterine Curettes.

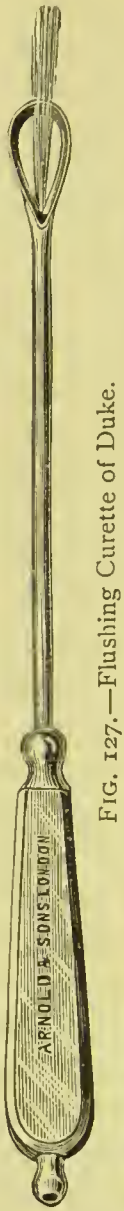


FIG. 127.—Flushing Curette of Duke.

FIG. 128.—Curettes for use in Cancer of the Uterus.

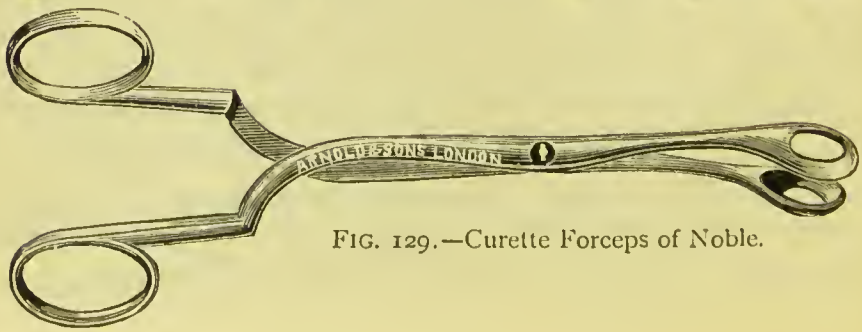


FIG. 129.—Curette Forceps of Noble.

in character, and the tissue friable, while the mass to be removed is considerable, it is well to cleanse out the uterine cavity periodically with a mop of cotton-wool moistened with an antiseptic solution, or to use the flushing curette, and to examine occasionally by the rectum, to ascertain that we are not running the risk of perforating the peritoneum and the pouch of Douglas. Also similar precaution should be taken with regard to the bladder by passing a sound into it. Some surgeons are fond of plugging the uterine cavity after carefully cleansing it out with iodoform gauze. For my own part, my invariable practice is, having thoroughly cleansed out and dried the curetted cavity, to apply a solution of chromic acid by means of the cotton-wool carried on the end of a sponge-holder, and then to tampon the uterus and vagina with iodoform wool or gauze. A hypnotic should be given the night of the operation, and the bromide and chloral mixture is of service for the first forty-eight hours or so subsequently. After this time it is my practice to dress the uterine cavity and vagina from day to day. If drainage of the uterus should have also to be carried out, I remove the iodoform, drain and cleanse the cavity, reinserting the gauze and continuing this treatment as long as I deem it necessary.

The following case, brought by me before the Gynæcological Society on July 9, 1896, will illustrate the value of this plan of treatment.

Chronic Suppurative Endometritis, with Salpingitis, cured by Curettage, Chromic Acid, and Iodoform; Drainage of the Uterus.—A widow, aged forty-eight years, had suffered for years from an enlarged and retroverted uterus. She had also two or three attacks of pelvic perimetritis. There had always been more or less endometric discharge since the birth of her child twelve years previously. In November, 1891, she had an attack of pelvic peritonitis. This subsided under treatment, and subsequently she had a slight operation for hæmorrhoids and a small fistula of the rectum. The periods were always excessive. Suddenly, in January, 1893, having been subjected to a chill during menstruation, she had a severe attack of perimetritis, during which there was rather profuse hæmorrhage for a few days. This was attended by considerable fever, which lasted for nearly three weeks. The perimetric effusion was considerable. The uterus was forced down almost to the vaginal outlet. I feared at the time that there might be hæmatocele complicating the perimetritis. In the following month the purulent discharge recurred, and this continued, not-

withstanding various forms of intra-uterine medication, and on two occasions a prolonged course of the bromo-iodine waters of Woodhall Spa. The general health remained good, and there was little pain ; but the discharge was at times most profuse, requiring the change of four sanitary towels in the twenty-four hours. As these recurrences of discharge continued until the beginning of 1895, I determined to thoroughly dilate and curette the uterus. This I did on April 20, 1895, in the manner described in the text. The uterus at the time of operation was enlarged, the cavity measuring 4 inches, retroverted and retroflexed, in which position it was fixed. On free dilatation, a quantity of pus poured from an enlarged fundal cavity. Curettage was conducted with every antiseptic precaution. A solution of chromic acid, one drachm to the ounce, was applied subsequently to the use of the curette. The large cavity was packed with iodoform gauze, and this, after the first few days, was renewed from day to day, the cavity each time being wiped out with a 1 in 5,000 perchloride of mercury solution, and the vagina packed with tampons of the same. Some slight discharge appeared at the end of the third week, but intra-uterine dressings were continued until it had completely disappeared. The final result of this case was a reduction of the uterus to about one-half its size and the restoration of mobility. The statement of the patient, over a year after operation, was : ' Present state of health excellent ; never felt so well in my life.'

Dangers of Curettage.—The point must be emphasized that curettage, especially in chronic cases of uterine affection, is not without its risks. This remark applies particularly to the operation when it is carried out with the aid of dilatation in the instances of women in whom there may be reason to suspect past trouble of the annexa. Dormant states of the ovary and tube may be roused into acute disturbance, and suppurative mischief in the annexa may be started. This may occur even though every conceivable care and precaution may have been taken in carrying out the operation.*

It is better, therefore, not too lightly to speak of, nor to minimize the possible effects of, an operation such as curettage in a chronic case of pelvic disease.

Christopher Martin, of Birmingham, in a paper entitled

* A lady, aged forty-two, who previously had the uterus dilated and explored, was again by me dilated, and the unhealthy portion was curetted. Carbolic acid was applied to the cavity. She had had continuous hæmorrhage for some months from a large subinvoluted uterus. There was some attendant endometritis. On the third day she had a severe attack of uterine colic. This was followed by a long and anxious time, during which an abscess formed in the left broad ligament, which was opened from the abdomen and drained. The patient finally made an excellent recovery, and from the date of the operation to the present time there has been no bleeding.

LOS ANGELES

LOS ANGELES SURGICAL SOCIETY

'When and how to Curette the Uterus,' confirms the caution I have given in the text with regard to salpingitis.

'I have seen,' he says, referring to curettage when there is old or recent septic or gonorrhœal inflammation of the annexa, 'a slumbering salpingitis converted into a virulent and fatal pyo-salpinx by such a proceeding.' Again, his criticism on temporizing with offensive discharges or hæmorrhage, due to the retention of the products of conception, cannot be too strongly emphasized, though in these cases special care has to be taken with regard to dilatation and antisepsis. I cannot but agree with his comments on curettage as a palliative for hæmorrhage consequent upon simple myoma. I am convinced that 'useless scraping' of the endometrium, as is sometimes done in these cases, is attended with risks of sepsis, and is of no permanent benefit. In cases where it may be thought necessary, oöphorectomy is a far preferable procedure. As to cancer, he makes the practical comment that, 'at best, the respite is short, and in many cases when the disease again manifests itself it advances with fearful rapidity. When the growth is strictly limited to the cervix or the endometrium, we should offer the patient the more certain hope of cure afforded by vaginal extirpation of the uterus. If the disease be too far advanced for this operation, the less we interfere with it the better.'

On the other hand, it is only right to say that I have had some excellent results in temporarily arresting hæmorrhage in cases in which the patient would submit to no operation other than curettage, and in which the use of the curette was followed by the application of chromic acid.

Orloff also advocates the operation in such cases, as allowing time for recuperation in small fibroids which do not cause pain, and in those instances where the menopause is approaching.

Dangers of Dilatation.—In two important communications made to the Obstetric and Gynæcological Society of Paris, June, 1895, by Bonnet and Fournel, and quoted by Edge in the *British Gynæcological Journal*, February, 1895, p. 384, the relative indications and contra-indications, advantages and disadvantages, and the dangers of dilatation of the uterus and drainage, are clearly set out.

The conclusions of Fournel, very strongly framed, show a bias against dilatation in peri-uterine lesions. He points out that the normal uterus, if tamponaded, gives forth a discharge; that dilatation cannot possibly touch many of the diseased states of the annexa; he disagrees with Doléris as regards the success and efficiency of the treatment. While allowing for its indication in

non-suppurative conditions suitable for expectant treatment, he condemns it in suppurating lesions, and emphasises the caution that dilatation causes indirect mischief to the general health as well as to the pelvic organs. He asserts that the fatal results of such radical operations as oöphorectomy and hysterectomy have their mortality increased by previous dilatation. Bonnet, on the other hand, agrees with Walton, Poullet, Doléris, Labadie-Lagrave, and others, on the efficacy of dilatation, curettage and drainage in salpingitis, and in affections of the annexa complicating displacements of the uterus. He says: 'I have never seen a fatal result, nor any aggravations of the lesions of the appendages, when the treatment has been carried out properly and gradually. In recent cases of cellulitis, and in cystic conditions of the endometrium, he advocates dilatation.

The truth with regard to dilatation may be placed as midway between the views of its advocates and opponents. In such capable hands as those of Olshausen, death has followed from dilatation; and that even with the greatest care and complete antiseptic precautions alarming symptoms may arise consequent upon its employment, has been proved to myself. This I have shown in a case in which pelvic abscess followed. True, I have never had in my own practice a fatal issue, but I have thus emphasised the unfavourable possibilities of the procedure, in order to draw attention to the unavoidable risks that are associated with it.

CHAPTER VI.

DISORDERS OF MENSTRUATION—INTRODUCTORY—AMENORRHŒA.

Ovulation and Menstruation.—To comprehend any deviation from a normal and healthy act of nutrition of any organ, we must clearly understand the processes involved in the normal discharge of its functions, and the anatomical and histological facts bearing on that act of nutrition, from its incipient stage to its completion. To no physiological process does this rule apply more closely than to the deviations commonly met with in the menstrual act of ovulation. Perhaps the most perfect example of a nutritive process, elaborated through the healthful interchange of function on the side of the circulating current on the one hand, and the tissues and the nerve elements on the other, is offered in the completion and perfection of the act of ovulation.

The following observations of Bland Sutton, in the recent edition of his work on the ovaries and Fallopian tubes, are of importance:*

'It is very difficult to uproot a tradition, especially one so ancient as the belief in the intimate association of ovulation and menstruation, but evidence is rapidly accumulating which will show that the two processes are not so intimately connected as was formerly believed.

'In the ovary of the human fœtus, ova ripen, form follicles, and undergo suppression during the last month of intra-uterine life. This has been observed by De Sinéty, Waldeyer, Beigel, and others. I have also assured myself of these facts, and have also detected a similar process in the ovaries of fœtal mammals, including forms as widely separate as kangaroos and lemurs, deer and donkeys, sloth and lions.

'The life of the human ovary may be divided into the following periods of

* See pp. 28 and 39.

activity and repose. The first period extends from the seventh month of intra-uterine life to the end of the first year. Ova ripen in such abundance that in some cases a marked diminution in the number of the ova is appreciable at the second year after birth. To this succeeds a period of comparative repose, terminating at the tenth or twelfth year ; then the ripening of ova is again easily detected, and goes on independently of menstruation, even after the accession of the climacteric.

'In female monkeys and women ovulation and menstruation are probably independent processes. Maturation of ova from the period of puberty until senility is going on constantly, and the presence of a ripe ovum concurrently with menstruation is a coincidence. In a healthy woman a ripe follicle may generally be found in the ovary between the tenth and fiftieth year, independently of the menstrual period.

'The œstrus, rut, or heat, of mammals is a term applied to certain objective signs that the female will receive the male, and is usually associated with ovulation.

'Ovulation signifies the escape of mature ova from the ovary.

'Although these two processes may occur independently of each other, still, we cannot doubt but that they are physiologically associated, and it is a fact beyond dispute that if the ovaries and Fallopian tubes be removed from a woman who has menstruated with the greatest regularity for years, and is still in the bloom of sexual life, we may predict with almost absolute certainty that menstruation will cease.'

Leopold and Mirinoff, while they conclude that menstruation and ovulation are usually coincident, believe that the former act is often independent of the latter, and is not directly dependent upon the bursting of the Graäfian follicle. Ovulation, these authorities believe, is a consequence of the increased congestion of the pelvic organs at the time of menstruation, when a typical corpus luteum results. For menstruation to occur, the ovaries must be present, and the endometrium normally developed. Menstruation occurring at another time than that of ovulation may lead to the rupture of unripe ovisacs. This may happen after the climacteric, immature corpora lutea resulting.*

Byron Robinson has written some thoughtful papers in the *Medical Brief* on the 'Abdominal Brain' and 'Automatic Visceral Ganglia,' in which the aberrations of the menstrual functions in women are ascribed to the nervous supplies of the ovaries and uterus, arising in what he terms 'the abdominal brain,' and the renal and abdominal plexuses of the sympathetic

* *Ann. Univ. Med. Sci.*, vol. ii., 1895.

nerve. This source of nerve-disturbance is in a condition of hyper-excitation at certain times, especially during the menopause. During this time the woman suffers from perverted nutrition in her sexual organs, and slight peripheral excitations are sufficient to originate reflex disturbances. The obvious deduction to be drawn from these physiological correlations is that, while soothing any local painful and irritating states in the organs within the pelvis, we have often to look outside these to the general nervous system for collateral visceral neuroses elsewhere during the critical times of puberty and the climacteric.

Martin of Birmingham insists on the dependence of menstruation on a special nervous supply, issuing from a special nerve centre in the lumbar portion of the spinal cord, the arrest of the function after oöphorectomy depending upon section of the menstrual nerve. He believes that either the pelvic splanchnics or the ovarian plexus are the roads through which the menstrual impulses travel to the uterus. He urges that all the physiological facts connected with menstruation point to this control by a special nerve centre.

There must be perfect relation of blood-supply, both in character and quantity, and healthful control of nervous influence, not only on the part of the nerves distributed to the various tissues involved—arterial, muscular, cellular—but on that of the central nervous system. Nowhere is this made more manifest than in the influence exerted on the ovary and uterus during mental states, reflex disturbances, or shocks, which show their immediate effects in arrested and perverted menstruation. It is outside the scope of this work to enter into a detailed description of the act of ovulation and the associated process of menstruation. This is more distinctly a portion of the physiological course of the student, and is dealt with in a more perfect manner than I could possibly hope to do in a work of this nature. It must suffice to remind the reader of a few facts, connected with the act of ovulation, which bear on some of the clinical phenomena of menstruation.

Important researches bearing on the part taken by the Fallopian tubes and ovaries in the menstrual act have been made by Bland Sutton and Arthur Johnstone (U.S.A.). The former, as the result of his investigations on monkeys, has come to the conclusion that the mucous membrane is not disintegrated to the extent previously represented, and that only the epithelium is shed, while the utricular glands are enlarged, and blood is discharged from the denuded epithelial surface. Johnstone regards the endometrium above the os internum as a cytogenic membrane and belonging to the class of so-called adenoid tissues, 'menstruation being for it what the lymph-stream is to the lymph-gland, or the blood-current to the spleen.' He looks on the simplest definition of menstruation as 'a periodic wasting of those corpuscles that are too old to make a placenta.' He agrees with Bland Sutton that the epithelium alone is shed, and that the mucous membrane is not disintegrated.* Bland Sutton states that in the human female 'the Fallopian tube undergoes no structural change during menstruation.'†

In a paper read before the Gynæcological Society of Great Britain, on 'The Coincidence of Ovulation and Menstruation,' Tait reviewed the physiological results in fifty-one cases of oöphorectomy with removal of the appendages. Miss Clark made most careful dissections of the ovaries, and noted the condition of the corpora alba and corpora lutea. In all, the ovaries were practically destroyed. Tait comes to the conclusion, from these dissections, that in menstruation we are dealing with a function associated with the uterus and Fallopian tubes, inasmuch as menstruation and ovulation were only 'coincident' in twenty-six out of the fifty-one women; in seventeen they were not coincident; eight were doubtful. I must, however, add that such pathological evidences, while they support the other proofs of the uterus being the prime menstruating organ, do not appear to me to invalidate the clinical importance of other physiological facts that establish the relationship between ovulation, at whatever time it takes place, and the menstrual flow. Lémière explains such persistence of menstruation after removal of the ovaries and tubes by an organic habit of the nerve-centres and uterus, enabling the latter to discharge the function.

At a certain period of female life, varying generally from the twelfth year to the seventeenth, known as that of puberty, a sanguineous excretion occurs from the uterus. I have known several instances of menstruation occurring from the eighth to

* Proceedings of the British Gynæcological Society, June 23, 1886.

† 'Diseases of the Ovaries and Fallopian Tubes,' 1896.

the tenth year. Barnes has recorded a case of a girl, aged eleven, in which the catamenia commenced at sixteen months and continued regularly. And Mengus has reported regular menstruation in a child twenty-three months old. A case of menstruation on the second day after birth has been recorded by Thum. The discharge was sticky, and oozed from the vagina. On the third day of its appearance from one drachm and a half to two drachms of bloody mucus passed, the flow disappearing on the fifth day.*

Though not strictly appertaining to this subject, I may here mention the fact that, with my friend Gelston Atkins, of Cork, many years since, I induced labour on the 250th day in a girl of twelve years of age. She was delicately formed, and the pelvis was narrow; the forceps had to be used. The child survived only a short time. The young mother, who was never told what was the nature of her 'tumour,' was kept under chloroform from the time labour set in; the milk was suppressed with belladonna, and, so far as I know, she never discovered the nature of the operation performed on her.

This flow of blood is an outward and visible sign of the completion of the ovarian function of ovulation, or the full development of a Graäfian follicle, its rupture, and the escape of the ovum. Attendant on the first appearance of this catamenial flow, changes appear in the mental and physical nature of the girl: it is the springtime of her existence; and her whole system participates in the budding forth of her sexual life. There is a hyperæmia of her sexual and mammary organs. Local congestions may occur in the ovaries, uterus and rectum; remote excitations in other organs, as the brain, heart, and lungs; reflex disturbances, having their origin in the ovaries, irritation of the ovarian nerves.

Pigmentation.—The pigmentary changes that occur contemporaneously with the menstrual act have been noticed by various writers. At the Gynæcological Society this year I quoted the following case:

Vasomotor Coloration of the Face, with Pigmentary Changes associated with Abnormal Menstruation.—A girl, twenty-two years of age, suffered from the most severe dysmenorrhœa and cöphoralgia. This had lasted for some three years, and first came on after a shock. I saw her in 1895, being indebted to Mr.

* *Ann. Univ. Med. Sci.*, vol. ii., 1895.

Roe Carter, of Sydenham, for the case. There was a conical cervix, with the ordinary pinhole aperture. I divided the cervix, and she wore an intra-uterine stem for a short time. The operation had no material effect on the dysmenorrhœa. Subsequently I tried both faradization and galvanism, also without effect. But what I wish to draw attention to specially is the curious discoloration of the face, much more marked than in ordinary menstrual chromidrosis or pigmentation of the lids. I have not seen any case recorded exactly like the one I refer to. On two occasions I have seen the cheek ecchymosed exactly as if it had had a severe contusion from a blow, passing subsequently through the various phases of coloration. The circles under the lids, extending below the malar bones, often varied in hue, and these changes were frequently very rapid, varying from purple to a deep greenish black. Sometimes the forehead became involved, and the whole face would assume a purplish colour, the conjunctivæ sharing in the suffusion. These changes generally preceded the catamenial epoch, becoming intensified during its occurrence, and disappearing slowly after its close. The case was quite distinct from any I have previously seen. For example, in the instance of a lady who was under my care for some time, several of her female friends thought that the black circles were artificially produced. So black were they that they had the appearance of being produced by Indian ink.

Menstrual Congestion of the Dental Pulp.—Régnier (*Revue Médico-Chirurgicale des Mal. d. Femmes*, December, 1891) instances a case of a lady who had a carious tooth plugged with platinum, the pulp being exposed while the cavity was bored out. Every month thereafter, exactly at the time of menstruation, she had severe neuralgia in the affected tooth, lasting for forty-eight hours. The only satisfactory explanation seemed to be that there was a periodical congestion of the pulp, causing it to swell and press against the filling, thus producing neuralgic pain.

This recurring hyperæmia of ovary and uterus, with the associated vascular and nervous disturbances, continues for some thirty or forty years of the woman's life—her summer. And now we approach the critical autumn time, when this fertilizing process begins to wane, and gradually ceases altogether —the period of the menopause, from forty-five to fifty, or thereabouts, when again we find her subject to local and remote congestions, cerebral affections, vicarious hæmorrhages from various organs, cardiac complications; at the same time occur exaggerated reflex disturbances and nervous 'discharging lesions.' These accompany that 'change of life'* during which are developed those traits of womanhood which stamp with peculiar and characteristic features the period antecedent to the winter of old age. It is not, however, to the change in the

* See p. 39, on the Climacteric.

uterine mucous membrane, and the periodical hyperæmia of the uterine tissues, with the consequent flow of blood, that we are to look for an explanation of these phases and phenomena. It is to the antecedent act of ovulation. True, a woman may menstruate (in so far as a mere periodical flow is concerned) without ovaries, but then it is most probably the mere perpetuation of a habit. As a physiological act it has lost its prime significance. It is on the ovaries rather than on the uterus that the gynæcologist has to concentrate his attention, in investigating the normal, and in treating the abnormal, menstrual molimen. We do not find any accurate explanation of many of the phenomena of menstrual life. There is a something in these not to be explained by any anatomical or physiological facts connected with ovulation. The effects of its mysterious influence on the entire being of the woman may not be measured by any descriptive language. The explanation is not in the swollen and sensitive ovary, nor in any changes that occur in the parenchyma, in the maturation and rupture of the Graäfian follicle, in the accompanying congestion of the Fallopian tube, nor yet in the swelling, proliferation and disintegration of the epithelium of the uterine mucous membrane.

This strange coincidence, of a mental and physical state being closely dependent upon the healthful discharge of the function of a single organ, is best recognised when we watch the consequences of perverted action, or of any arrest or suppression of the ovarian function. 'The *essential thing*,' as Schroeder says, '*is the discharge of the ovum*;' the escape of blood from the mucous membrane is an accessory occurrence which is, perhaps, only the indication of the retrograde metamorphosis of that membrane. Conception may occur while the external evidence of ovulation is absent, as we have seen that the menstrual flow may periodically appear when the ovaries are removed. The congestion of the ovaries and other genital organs may take place with the discharge of the ovum, while there may be no laceration of the uterine vessels, and

the usual escape of the disintegrated mucous membrane may not follow. From these few brief remarks we can infer how important to the health and well-being of the woman is the due performance of this function on the part of the ovary. And though we do not regard the uterine changes and flow as of the same essential significance, yet, remembering the hyperæmic condition of, and the local determination of blood to, all the genital organs at the time of menstruation, we can comprehend how serious may be the consequences of a partial or complete suppression of this escape of blood from the uterus, the arrest of the normal process of disintegration and exfoliation of the uterine mucous membrane, and the resulting retention in the blood of the abnormal elements of excretion. This brings us to the consideration of the simplest departure from the normal act, viz., amenorrhœa.

Menstruation generally occurs from puberty to the ages of forty-five or fifty, every twenty-eight days or at a longer interval (quite compatible with health). The discharge lasts from three to seven days, or longer. It consists of blood and disintegrated débris of uterine mucous membrane, the quantity of which varies with the duration of the flow. It is influenced by climate, temperament, coitus, habits and rank of life, temperature, blood-states (as the exanthemata, phthisis, Bright's disease, chlorosis, anæmia, leukæmia),* mental influences (as depression, shock, hysterical condition, the effects on the mind of illicit intercourse and seduction); local disorders of the genital organs and rectum (as fibroid developments, uterine version and flexion, hyperplastic states of the uterus); morbid growth of, or abnormalities in, the development and position of the ovaries; any congenital or acquired stenosis or atresic condition of the genital canal from the Fallopian fimbriated orifice to the vulva.

* While the psychological importance of the establishment of the menstrua function in women who are mentally affected cannot be overlooked, this fact, that the suppression of menstruation is often the consequence of the psychical state, and not its cause, has to be remembered. I refer to these psychological correlations further on (consult chapter on Oöphorectomy).

To the student a short classification of abnormal menstrual states may be acceptable.

Amenorrhœa: 1. Primary, frequently persistent (emansio mensium).

2. Secondary, usually temporary (suppressio mensium).

Dysmenorrhœa:

Ovarian, due to	Congenital abnormalities Congestion and obstructive congestion Ovaritis Apoplexy Changes in corpora lutea Cystic degeneration Cortical and interstitial sclerosis Gonorrhœa Cirrhosis Adhesions.
Tubal, due to	Congenital abnormalities Inflammation Adhesions Displacement Strangulation Cystic disease.
Uterine, due to	Congenital malformations Version and flexion of the uterus Stenosis of the cervical canal Interstitial fibroids Polypi Traumatic causes (results of operations) Endometritis.
Atresic	Atresia of Fallopian tube ,, uterine canal ,, vagina ,, vulvar orifice.

Membranous—A special form of uterine dysmenorrhœa.

Menorrhagia: 1. Catamenial excess (either simple excess in the normal physiological and pathological process, or the result of a morbid condition of the ovaries, uterus, or other organ, as the heart or liver).

2. Climacteric; occurring at the menopause.

Metrorrhagia: Abnormal flow of blood during the intervals between the menstrual acts.

3. Vicarious (diverted)—pneumonic (hæmoptysis); nasal (epistaxis); gastric (hæmatemesis); cutaneous; renal (hæmaturia); cerebral and retinal; rectal.

Amenorrhœa.

Causation.—1. Removable causes (excluding pregnancy), many of those cited above as influencing ovulation and menstruation.

2. Irremovable causes—absence, or congenital malformation and arrest of development, of the ovaries, Fallopian tubes or uterus; acquired disease of the ovaries or uterus.

We find that the commonly occurring causes associated with a diminution or temporary absence of the menstrual flow are:

(*a*) Anæmia and chlorosis;

(*b*) Plethora;

(*c*) Some accidental influence operating on the woman, as mental shock, fright, cold, sea-bathing (all these repressing causes have a more decided effect if they occur at or about the time of a menstrual epoch); acute and chronic wasting diseases; the exanthemata;

(*d*) Congenital.

Differential Diagnosis from Pregnancy.—As it is the rule, though there are occasional exceptions, that the menstrual flow ceases during pregnancy, it is always our duty, in any suspicious case, most carefully to exclude any chance of this condition being the source of the trouble. The student of midwifery has already studied all the signs and symptoms of the pregnant state. He is aware how difficult it is, before the uterus rises above the pubes, to speak with any degree of confidence of the existence of pregnancy. *On no question must we guard our expressions or our suspicions more than on this.*

Recently a lady consulted me to ascertain whether she was pregnant or not, as she was desirous of taking a long holiday trip, and would not venture if she were. There had been a gap of one month, and then two slight periods. She volunteered the information that she had consulted a doctor, and he told her, *after examination with the uterine sound*, that he believed she was not enceinte. She also told me that she had domestic reasons for not wishing to have a child. The means used in diagnosis should at least have solved for her this little difficulty.

Both in those cases in which the possibility of conception is for any purpose concealed or denied, and in those in which the desire of the woman is parent to the belief, and she assumes that she is or is not pregnant, is this caution necessary. It requires considerable tact to avoid committing one's self to an opinion until such a period of pregnancy has arrived when we are able to speak with confidence.

I do not enter fully into the differential diagnosis of pregnancy; this is exhaustively done in every treatise on midwifery. This table of the most important proof, divided over three periods, may be of service:

FIRST PERIOD.	SECOND PERIOD.	THIRD PERIOD.
Cessation of the menses; reflex and sympathetic disturbances; changes in the breasts; morning sickness; enlargement of the uterus and altered position, with commencing change in the os uteri and cervix; vaginal signs in alteration of colour and increase of natural secretion.	Progressive increase in the size of the uterus, which continues until the close of pregnancy, with characteristic alterations in the abdomen; further changes in the breasts (areolæ—secretion); fœtal projections and heart-sounds; ballottement; placental souffle.	Uterine contractions well felt; more characteristic changes in the os uteri and cervix; all the signs of pregnancy becoming more manifest.

Hegar's sign consists in the uterus losing its pear-shaped outline; 'the body is bellied out over the cervix in all the transverse diameters, especially antero-posteriorly.'

It may be accepted as a general rule, to which we have

occasional exceptions, that we are correct in surmising that a married woman in fair health, who has ceased menstruating, with an enlarged uterus and softened os and cervix, is pregnant. We must not, however, be too ready to be influenced by her own assertions that she has menstruated, or, rather, thinks she has, and thus be too quickly led into passing the sound. Women mistake other blood discharges for those of menstruation, and the existence of pregnancy is not to be negatived because a woman has had even severe losses. I have known the pardonable error made more than once of the sound being passed for assumed subinvolution, and abortion follow. In both cases the woman ridiculed the idea of pregnancy.

Referring to Hegar's sign, the following observations of Charles Noble are of practical moment:

'Within six weeks after the beginning of pregnancy the ovum has grown sufficiently to cause the corpus and fundus of the womb to assume a distinctly spheroidal shape. As during this time the cervix has altered very little in its form, we have present, to make use of geometrical terms, a spheroidal body posed upon a cylinder. If one will picture this state of affairs, he will see that the sphere juts out from the cylinder prominently and in every direction. In other words, when examining the pregnant uterus between the sixth and twelfth weeks, the uterus will be found enlarged to correspond with the period of the pregnancy; the corpus and fundus will be found as a spheroidal body, and the corpus can be easily made out as jutting boldly out from the cervix in front, behind, and at each side. In my experience this sign is of the utmost value and absolutely reliable. The judicious practitioner, however, will not neglect to make use of corroborative signs and symptoms. The spheroidal body of the womb will be found softened, and as it is held between the two hands in bimanual examination, a feeling of semi-fluctuation can easily be made out. This softening and semi-fluctuating feel should be found in all cases.

'It is well to say a word about conditions which prevent the examiner from making out this characteristic sign of pregnancy. It will be readily seen that if pregnancy should occur in a womb which already contains a fibroid tumour, the sign is not available. This is equally true when the pregnant uterus is jammed in between tumours of the ovary. Extreme development of adipose tissue may prevent its recognition, on the one hand by making the abdominal hand unavailable, or on the other by preventing the examining finger from reaching high enough up *per vaginam* to make out the form and consistency of the uterus. It will occasionally happen also that pregnancy takes place in a womb bound down by adhesions, in a pelvis in which the structures are distorted as the result of former inflammatory processes. In such cases the development of the pregnant womb is frequently atypical. All the conditions

described have been encountered, and my remarks concerning them are based upon experience. In such cases the examiner usually finds enough to awaken his suspicions, but not enough to form a positive diagnosis, and thus is obliged to reserve his opinion.'

From the fifth to the sixth month, in the great majority of cases, we can speak with confidence of the uterine enlargement being due to pregnancy. Yet, remembering how often we meet with complications, such as fibroid tumours, ovarian cysts, ascites, flatulent distension, hydramnios, we had better keep always before us the fact that *the only absolute proof and infallible test of pregnancy is the auscultatory one of the fœtal heart-sounds*. In all the others a man may be deceived. This must be so, or we should not have the fact occurring that the greatest gynæcologists commit the error of opening the abdomen for a tumour, ovarian or uterine, or the operation of paracentesis abdominis for ascitic accumulation, to find a pregnant uterus. Nor would we find the awkward mistake made in the opposite direction—woman, nurse, and practitioner awaiting the discovery of a phantom pregnancy and flatulent accumulation.

Anæmic and Chlorotic states are easily recognised in the pale conjunctiva, the colourless lip and gum, the white complexion; and in marked leukæmia, the wax-like look of the skin, the anæmic first sound and functional irregularities of the heart, the jugular pulse or bruit, the pale retina, the puffy state of the face and eyelids, and the accompanying group of neuralgic or hysterical symptoms constantly associated with these physical signs. Most marked of these are headache, loss of appetite or capricious tastes in diet, lassitude, dislike for outdoor exercise, sleeplessness, neuralgic pains in different places, attacks of syncope, and a rather characteristic pain referred to the left side of the chest beneath the region of the heart. It is in such a general depraved state of the system that we are often consulted. The watery blood, with red corpuscles diminished in quantity and altered in their physical characters, does not respond to the demand of ovary and uterus; the vitality and nutrition of both organs are lowered. The act of

ovulation gradually ceases, or may not occur at the proper time, or it is abortive and irregular, while the menstrual discharge is lessened, changed, or absent.

Plethora.—Just the reverse of this condition is met with in *the plethoric* and full-blooded. Here there is a hyperæmic condition of all the sexual organs. They participate in the general state of plethora of the entire system, and the other vital organs. The normal balance of blood-supply and nutritive growth and development is lost; congestion of both ovaries and uterus results. The act of ovulation is either prevented or arrested through this undue blood-supply; or it becomes at first irregular in time of occurrence, and in the quantity of the menstrual secretion, and, gradually interrupted, finally ceases. This type of case is easily recognised. The ready flush, the high complexion, the throbbing vessels, the strong and full pulse, with accompanying symptoms of headache, functional heart palpitations, proofs of congestion elsewhere in the lung, kidney, or retina, are a few of the signs that tell us of the cause of the amenorrhœa.

Accidental Influences.—We find these in injudicious habits of dress, diet, exercise; in some mental shock; in the sequelæ of various acute diseases which have lowered the vitality of the system, or interfered at the time of its occurrence with the menstrual function. If we go carefully into the history of any case when first we are consulted, we can generally place our finger on the fault which has, directly or indirectly, led up to the cessation of the menstrual flow, or its altered character. Indeed, in a large number of cases that come before us, it is to a depraved mental condition we must look for the primary source of the evil (see p. 146).

Congenital Defects.—When we are consulted by parents, or by the patient herself, for delayed menstruation, before making any internal examination it is well to enter carefully into the previous history. We can ascertain if there have been an indication at any time of an effort at ovulation, such as recurrent pains at special times in the back or sides, or an attempt at periodical

discharge of any kind; if there be a general arrest in development in the direction of womanhood, both physical and mental; or if we can trace to any accidental cause the arrest or suppression of the flow. If not, we must keep before us the probability of congenital defects in ovaries, uterus, and vagina. If ordinary remedies fail to produce any effect, a careful digital examination in *the presence of the patient's friend or nurse* may be called for. By its help we may decide the question of congenital defect. Such an early examination is especially demanded in young married women, and in the unmarried more advanced in years, particularly if we have a history of old attacks of vaginitis, uterine displacements, pelvic peritonitis, or more urgent symptoms indicative of retained menstrual flow.

Indications for Treatment.—These, once we decide the cause of the amenorrhœa, are clear. In anæmia—in the first instance, to restore to the sexual organs their normal blood-supply, and correct the constitutional vice disposing to this morbid state; and secondly, to apply to these organs such local therapeutic means as are calculated to induce or re-establish the natural performance of their functions. We must correct those habits that have a deleterious influence on the general health, and on the sexual organs in particular.

Questions of clothing, diet, exercise, mode of living, and occupations, have all to be carefully gone into. The use of warm clothing; the wearing of light flannel next the skin (vest and drawers); the avoidance of modern devices for strangling the abdominal and pelvic viscera; the securing of due warmth in the extremities, both hands and feet; proper support for the under-clothing—all must be insisted on. So it is a good plan for the practitioner to give each patient her individual diet table systematically arranged, omitting all those articles of food which are calculated to cause or sustain dyspeptic states, and which are in themselves likely to deprave the blood. Sufficient quantity of animal food should be given, if necessary, in any of the forms of liquid and concentrated foods, or poultry, game,

fish, and milk, according to the digestive powers of the patient; moderation in alcoholic stimulants, avoiding their careless recommendation, or a fanatical denial of their therapeutic value.

The combination of 'beef-iron wine,' containing in each fluid ounce the *stimulant* value of two ounces of fresh beef and four grains of iron citrate, of Messrs. Burroughs, Wellcome and Co.; pepsine wine; some of the numerous malt preparations, as malt extract, ferrated maltine, or malted milk; Stearn's 'wine of cod-liver oil extracts and peptonate of iron'—all have their special virtues, and will assist our treatment according to the constitutional features of the case.

Attention to the times of meals and the intervals between them is of equal importance to their character. Speaking generally, light and digestible meals, not taken at long intervals, and never late at night, will be found most judicious. So we must correct, when possible, those pursuits and their effects which tend to corrupt the blood. Overcrowding in sleeping apartments, heated rooms, ill-ventilated sitting and bed rooms, prolonged sedentary employment, much stooping or standing, excessive study and long school-hours, want of suitable out-door exercise and amusement, sustained and violent muscular exercise, as now frequently taken in cycling, have to be firmly condemned.

The Dangers of Cycling.

The rage for cycling which has developed among women of all classes within the last few years, must seriously affect, according as the exercise is abused or otherwise, their health. This may be looked at from two points of view: either from that of its influence on the general health, and thus indirectly on the sexual organs and generative functions of the woman, or, more directly and immediately, on these organs themselves. Already I have seen several cases in which imprudence, both in the distances ridden and in the speed of riding, has impaired the health, causing both irregularity and irritability of the heart's action, and inducing general constitutional weakness, and, in some instances, anæmia. Obviously, prolonged pressure on the external genitals must affect all the parts from the coccygeal structures to the os pubis. Sufficient time has as yet hardly elapsed to enable us to form any accurate opinion on the permanent effects that may follow in a certain proportion of cases from the constant use of the bicycle. There are, however, some points on which it is right to caution women and young girls who may be over-enthusiastic in the use of the wheel. Many women of advancing years are learning to ride. During the period of the menopause, more especially if they suffer from disturbances in the menstrual functions, cycling may have deleterious effects, and should not be practised without advice, certainly never when there is a natural

or erratic epoch present, or if the heart be functionally affected or the patient be anæmic. Those who have backward displacements, or who suffer from prolapse, must be careful in riding, if, indeed, they ought to do so under any circumstances. Younger women who suffer from menstrual irregularities and displacements or any degree of prolapse, had better not ride while under treatment. There may be exceptions to this rule, but they must be regulated by the individual peculiarities of each case, and by medical advice. The young girl who is anæmic, with functional hæmic bruit, should not ride, or should at least be cautioned not to do so to the point of over-exertion or fatigue. All 'scorching' should be discountenanced. Women afflicted with hæmorrhoids should not ride. Women now ride so well, and are taught so generally to maintain the erect position in the saddle, that it is hardly necessary to refer to the danger of the forward attitude, and there can be little doubt that the saddle with the falcon pummel may prove a serious source of sexual excitation. The character of the saddle is a matter of great importance to the woman cyclist. A good *pneumatic* saddle should be so constructed as to support well the ischia; it should not press on the external genitals or the coccyx, while there should be no projection under the pubes. We have thus emphasized some of the precautions that must be observed by those who cycle, but the benefits which are derived from this exercise by the great majority of women who indulge in it are not to be under-estimated.

Cycling practised within moderation is a healthful recreation and exercise, attended with most desirable physiological effects on the woman, both mental and physical. It enables many women to enjoy open-air exercise who would otherwise be deprived of it, and for many of the cases in which in the past vicarious exercise in the shape of 'massage' has been recommended, offers a much more satisfactory substitute. The perfect stationary bed-chamber cycles which are made in France can be well used by those who are not in a position to travel on the ordinary machine.

How many of the future uterine troubles of adult and married life are engendered by the routine overwork of modern boarding-school, when the mother's watchful eye is absent, only those who are so frequently consulted for the pernicious consequences know. If parents were often more alive to the danger, they might be more careful in the selection of the temporary home, on the domestic management and control of which so much of their child's future happiness depends.

Nor must we omit due attention to the cutaneous secretion —proper bathing of the entire body at a medium temperature (water 60° to 70° or 80°), if cold be not well borne, should be encouraged, also sea-bathing if it agree, and if a healthful reaction occur after it. Proper friction is essential, especially of the lower part of the back and the abdomen, after the bath.

A capital sea-water bath may be made by adding a few ounces of the essence of seaweed (Harvey's, Margate) to twenty gallons of warm or cold water. This preparation may be obtained through any chemist.

Atthill suggested a plan which for years I have followed with success. The patient is directed before she goes to bed to sit, protected from cold, in a small bath of water at a temperature of from 60° to 70°. The feet are either placed in hot flannel or in a small foot-can of hot water. After the bath the hips and lower part of the abdomen are well rubbed with a Turkish towel, and then the patient goes immediately to bed. Such spas as those of Kissingen, Schwalbach, Spa, Royat, Kreuznach, Vichy, Ems, may be resorted to. A winter at St. Moritz, or Davoz Platz, or in the Italian Riviera, if any phthisical tendencies are present, may be necessary, or a trip to the South of France, a short stay in the Tyrol or Switzerland, or at some of our own equally efficacious health-resorts.

Of the latter we have a full selection according to the season of the year and the nature of the case. There is an admirable iron spa at Felixstowe, and also at Tunbridge Wells. Strathpeffer I have had good results from. This course will often, if assisted by proper treatment and regimen, restore the health and arrested functions, when nothing will effect any change in the impure atmosphere of the crowded city.*

I briefly tabulate the most important therapeutical means for the treatment of amenorrhœa generally, reserving a few practical observations on some of the more useful of these drugs:

Iron (and its salts).
Arsenic.
Quinine.
Nux vomica and strychnine.
Ergot and ergotine.
} Chalybeates generally. Separately or in combination.

Aloes. } In combination (as Pil. aloes c̄ myrrha) with
Myrrh. } iron.

Saffron.
Cannabis indica—Cannabin.
Apiol.
Celerina.
Aletris.

* See the chapter on Health Resorts for a list of the more powerful spas.

Tincture of viburnum.
Borax.
Permanganate of potash—Dioxide of manganese.

Other Therapeutic Means:

Galvanism, combined with properly-applied massage.
Internal faradization.
Warm hip and foot baths.
Friction to spine.
Leeches to anus and inside of thighs.
Fomentations to the breasts.
Stimulating enemata.

Iron.—Before administering any form of iron, it is well to prepare the system for it. This is best done by the exhibition of some gentle saline aperient for a few days, such as a natural aperient water, or any of the effervescing saline preparations in ordinary use. It is well also to act on the liver by means of a mild laxative pill. We may combine a small quantity of hydrarg. c̄ creta with some vegetable cholagogue, as euonymin or iridin. For a few days before commencing the iron, an alkaline mixture, of bicarbonate of potash, or Mindererus' spirit (liquor ammoniæ acetatis) with spiritus etheris nitrosi—the simplest and best saline combination of all—may be prescribed. The diet should be regulated, and heavy meals avoided. Farinaceous food, with milk, should be taken. Sufficient time should be permitted to elapse after meals before the iron is administered; it should not be given while fasting. The particular preparation selected must depend on the features of the case, or the tolerance shown for the exhibition of iron, and the exact effect we are anxious to produce. The preparations I find most efficacious, in a large number of cases, are reduced iron, which can be given in pill or powder, alone or in combination; dried sulphate of iron, which can be combined with quinine, arsenic, or nux vomica in pill; the dialyzed solution of iron; the compound iron

mixture; tincture of perchloride of iron; the solution of the chloroxide of iron; the compound forms, ammonio-citrate and potassio-tartrate; the effervescing granular preparations in combination with quinine; bromide of iron, when we wish iron in conjunction with the bromides, is useful. I have found such preparations as those of Blaud and Blanchard (pills) or the perles of Tisey borne when other forms of iron were not tolerated. The phosphatic compounds (syrups of the hypophosphites of iron and quinine), Fellows' and Easton's syrups, or any of these combinations, may be assisted by chalybeate waters (such as those of Renlaigne, Schwalbach, Flitwick,* or Spa), and the preparations of ferrated maltine and beef-iron wine.

Arsenic, through its action on chronic uterine inflammatory states, is perhaps the most useful medicine we possess. The arsenious acid ($\frac{1}{30}$ to $\frac{1}{50}$ of a grain) may be well administered in pill, in conjunction with either quinine or iron, three times daily after food. Fowler's solution, as a liquid preparation and capable of combination, answers well. The peculiar susceptibility of some individuals to the effects of arsenic, as seen in irritability of the stomach, erythematous attacks of the skin, and inflammatory conjunctival states, is not to be forgotten when we are giving it for the first time to a patient. *Quinine* we may combine in administration with any medicine indicated for amenorrhœa. It may be given either with arsenic or iron, aloes and myrrh, ergotine, nux vomica in the form of pill, with various salts of iron; or the vegetable infusions, and any of the many elegant forms in which quinine is now prepared. The hydrochlorate of quinine, when we wish, can be conveniently given with the tincture or solution of the perchloride of iron. *Nux vomica* or *strychnine*, next to quinine, is perhaps the most valuable vegetable tonic we possess; more especially it is of service in the atonic and debilitated conditions associated with suppressed menstruation. It may be given in the form of extract, with either quinine, arsenic, or iron, in $\frac{1}{6}$ to $\frac{1}{4}$ grain

* This Bedfordshire Spa water is an admirable chalybeate—a tablespoonful is sufficient with meals. The liq. arsenicalis can be given with it.

doses, three times daily, after meals, or at times combined with ergotine. It is particularly indicated in those sluggish states of the bowel that we so frequently find complicating amenorrhœa. Here it may be added to an aloetic pill. But the most reliable mode of administering this drug is as the liquor strychniæ of the Pharmacopœia. It is better to prescribe a standard quantity, so that the ordinary half-ounce dose contains $\frac{1}{32}$ to $\frac{1}{40}$ of a grain. With glycerine and the dialyzed preparation of iron it forms an excellent mixture, to which the tincture of quinine may, if we so desire, be added. *Ergotine*, as an

FIG. 130.—Barnes's.

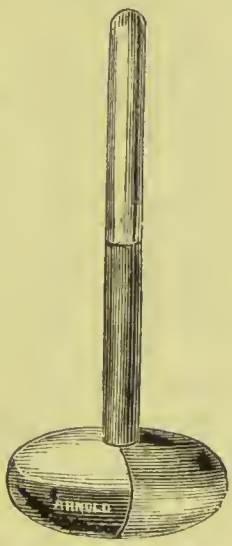


FIG. 131. – Rigid.

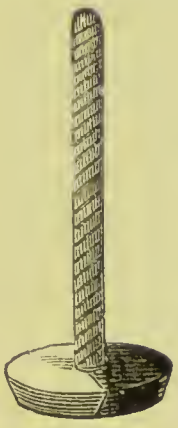


FIG. 132.—Simpson's.

FIG. 133.—Peaslee's.

Galvanic Stems.

emmenagogue, is a useful adjunct to any of these medicines. It can be given ($\frac{1}{2}$ gr.—gr. i. doses) with quinine and nux vomica. Ergot and most other pure therapeutic agents act mostly as emmenagogues. Borax in 10 grain doses I have occasionally found of service. It is best administered by itself in the form of powder. Apiol capsules are of use, especially if there be dysmenorrhœa, and have a similar action to ergot. Dioxide of manganese, in the form of tabloids, may be tried with advantage. Of the other therapeutic means, their mere enumeration is sufficient to indicate the object in employing

each. And first, with regard to the *uterine sound, before we take it up to induce a menstrual act, we must have positively assured ourselves of the absence of pregnancy.* Seeing the ill uses to which it is put, I confess that I do not like the idea of suggesting its occasional employment as a means of treating ordinary amenorrhœa. I am certain that practitioners have a more efficacious means in electricity, though here, of course, the same rule holds good as regards the elimination of pregnancy. In the chapter on Electro-Therapeutics the various vaginal and uterine electrodes are shown, and the methods of using these are fully described.

If the galvanic stem be inserted, the uterine canal must be sufficiently dilated to permit of its passage, and the stem passed into the canal on a stem-introducer, either by the direction of the finger or the aid of the speculum. The patient should be placed in the semi-prone position and the duck-bill speculum used. The uterus may then be brought well under control with a uterine hook, and the stem inserted; it ought not to be so long as to touch the fundus. It should be withdrawn if pain is complained of. Once inserted, if there should be a disposition to slip out, it can be retained in position by a small tampon of salicylic wool soaked in glycerine. All kinds should be looked at occasionally and reinserted, lest the secretions may have corroded the metal and softened the stem.

Special Therapeutic Notes.

St. Raphael Wine.—This wine should be given with some food. It will be best borne if commenced in small quantities (℥i. three times in the day), and gradually increased.

Aletris Farinosa.—This drug will be found useful in cases of associated amenorrhœa and dysmenorrhœa, also in erratic menstruation; 20—30 drops of the liquid extract may be given alone, or combined with tincture of digitalis.

Aletris Cordial.—This patent preparation I have found of use in several instances, given either alone or in combination.

Viburnum Prunifolium.—The liquid extract of Viburnum Prunifolium and its tincture may be combined with advantage with both Aletris and Hydrastis.

Dioxide of Manganese.—This most valuable medicine for amenorrhœa, in anæmic and chlorotic cases, and in emansio mensium generally, may be given

in gelatine pills, or in tabloids, which I find more convenient. I give two tabloids three times in the day (each tabloid containing grs. ii. of manganese dioxide).

Liquor Caulophilla (*Pulsatilla*).—I have tried this preparation on several occasions. Its effect has been variable. It has answered well in some cases of dysmenorrhœa with scanty flow. I have found it more efficacious when given in combination with '*Celerina*.' I can recommend this combination, not alone as an emmenagogue, but as a general tonic. '*Celerina*' I have had considerable experience of in all disorders of menstruation and the atonic conditions associated with uterine disorders generally. I have frequently given it with vascular tonics, and with the best results. Celerina is well administered with Horsford's Solution of the Acid Phosphates, or the Syrup of the Hypophosphites. (Celerina contains celery, coca, kola, viburnum, grs. v.—℥i.)

Santonine.—Whitehead and Hannah have found that santonine in 10-gr. doses is an efficient emmenagogue.

Seaweed Essence and Pine Baths.—An invigorating bath of seaweed essence may be made by adding a half-pint of Harvey's *Essentia Algæ Concent.* to the 20—24 gallon bath. I have large experience of this preparation, and can most confidently recommend it. Patients can obtain it straight from the maker at Margate.

Pumiline Essence baths are very refreshing, as also are prepared Pine baths.

Massage.—Massage is a powerful aid to treatment in amenorrhœa and dysmenorrhœa. The massage may be general, but more specially directed to the lumbar and sacral regions or the gluteal muscles. Its use may be combined with the warm bath of sea-salt or pine, and galvanism. The reader may refer for details of the massage treatment to the chapter on Massage.

Murrell (*Medical Press and Circular*, April 25, 1894) strongly recommends the extract or tincture of the senecio aureus (a species of ragwort) in amenorrhœa; two or three grains of the extract is taken in a pill three times in the day.

CHAPTER VII.

DISORDERS OF MENSTRUATION (continued)—DYSMENORRHŒA.

Pain.—Such states as congestion, obstruction, neuralgia, all attended by more or less spasm, are constantly met with in the same individual. In one large group of cases we find a tendency to amenorrhœa and scanty menstruation. The pain is clearly associated with anæmia; while in others the tendency is rather to plethora and congestion. So also the situations in which the pain occurs are variable; in the ovarian region, and along the inside of the thighs, if the ovaries should be, as is frequently the case, the organs at fault; pain in the back and over the pubes, if the principal cause of the dysmenorrhœa be in the uterus. Reflex pain in the head, chest, or abdomen, accompanying the local pain, is present, in some degree, in most cases of chronic dysmenorrhœa. Equally uncertain are the nature of the pain and the time of its occurrence. It varies from some slight aggravation of the common systemic disturbance antecedent to the menstrual flow, with pain referred to the back or sides, disappearing when the discharge appears, to the indescribable agony which the friends of the patient say 'they can only compare to labour pains.' The pain may precede the flow, and cease as this commences, or it may last all through the period, exhausting the woman physically and mentally. It is in such cases that the mind after a time is weakened, each period causing further prostration, until at last delirium is present, or perchance some

permanent form of mental aberration results. The term 'hysterical' is often employed to describe the pain complained of in these cases; so also a special class of pain is spoken of as 'neuralgic.'

Both terms are apt to mislead in practice. It cannot be doubted that a large amount of the pain complained of by some may be included in the general state known as hysteria, and with the type of pain looked on as neuralgic. And it is likewise true that the mental condition of the woman leads her to exaggerate the suffering and describe it in extravagant language, while her weakened nervous system cannot sustain any acute or prolonged pain. This is still further accentuated by the recurring anticipation before each period. But if such considerations influence a practitioner to regard any form of pain as fanciful or unreal, and induce him to look on his patient as 'whimsical' and, as he is commonly pleased to say, 'hysterical'—though what he may mean by this latter generalization he would often find it very hard to explain—he will make a serious mistake. It may lead him off from discovering the source of the disorder in the ovary, uterus, vitiated state of the circulation, or a depraved nervous system. *It is the safest rule in practice never to despise pain, no matter how trivial, and always carefully to seek for the cause of it.* Not the less must we do so because we feel convinced that our patient's mental powers are weakened.

It has been reported that women who have suffered agony from ovarian dysmenorrhœa were completely relieved by the deception of an incomplete oöphorectomy. When placed under chloroform, only the preliminary cutaneous incision has been made. I have seen the application of a metal disc over the ovary relieve ovarian neuralgia. Not long since I had a patient who, for some time, had morphia injected subcutaneously for the relief of ovarian and other pains: she suffered from most severe dysmenorrhœa. Occasionally she craved for the morphia, and implored us to increase the strength of the injection. By the justifiable deception of

seeming to yield to her entreaty, while frequently only pure water was used, she had a good night's rest, and expressed herself as eompletely relieved the next day.

We have no stronger proof of psyehieal influence over physieal eonditions than in the various applieations of metallotherapeuties, and the strange effeets of metal dises applied for the relief of hysteria and hystero-epilepsy.

I by no means desire to be understood as doubting the conclusions of the late eminent French psychologist, Charcot. I think that in ocular therapeutics, and in the effects of the metals when applied for various retinal states, we have evidence of the direct physical results of metallotherapy. I refer to the work of the Salpêtrière physician rather to impress on the student's mind the double-sided nature of most ovarian disorders. On the one side, physical, from the slight congestive and hyperæsthetic to the various pathological conditions met with ; on the other, psychical, as seen in all the so-called hysterical affections and states, complicating both the normal act of ovulation and any abnormal departure from the healthful performance of the ovarian function.*

Charcot originally took the view that the ovary is the *point de départ* of the paroxysm in the attack of hysteria and hystero-epilepsy—moderate pressure over the ovary inducing the aura hysterica, while more energetic compression arrests it, and also cuts short an attack, even when the convulsions have commenced. Pressure is made and maintained by the closed fist, which is pressed into the iliac fossa. Grailly Hewitt drew attention to the fact that this pressure also acts on the uterus, compressing its vessels, and diminishing uterine congestion. He regarded uterine displacements as having more to say to the hysterical phenomena than the dislocation of the ovary. Epileptic fits are sometimes stopped by pressure in *males* in the inguinal region. This acts on the sacral plexus of nerves, and the explanation is probably the same in some women.

From what has been said, it may be gathered that I regard as of doubtful seientific aceuraey any classifieation whieh has been made of dysmenorrhœa ; yet here, as in other efforts to elassify affeetions in which no well-marked lines of demarcation exist, we gain mueh in elinical diagnosis and treatment from the grouping of ideas resulting from a classification, though it may not be critieally aceurate. Broadly, we keep always in our mind, in practiee, the dysmenorrhœa which has its source in the ovary and its appendages rather than in the uterus. The pain is eharacteristieally ovarian, and we seek for congestion, swelling, sensitiveness, displacements of the ovary. There may be adhesions or effusions, and localized swellings in the broad

* Consult chapter on Oöphorectomy.

ligaments or Fallopian tubes. Or, on examination, we find immediately a satisfactory explanation of the suffering in the malformation of the uterus, in the congested cervix, the contracted uterine canal, some flexion or version, or an inflammatory state of the mucous membrane of cervix or fundus. The relation of ovary to uterus is too close to expect that this distinction of ovarian and uterine dysmenorrhœa should be clinically marked in a large number of cases. Thus we have the affected ovary reacting on the uterus, and any serious inflammatory affection of the latter organ influencing the former. But we are constantly meeting cases of dysmenorrhœa in which we can detect no mischief either in the ovary or uterus. They are normal in size, position, and freedom from adhesions; there is no fault in the patency of the uterine canal. Here we must look to the circulation or nervous system for the cause of the pain. This is traced either to the depraved quality of the blood, as in some anæmic state on the one hand, or to excessive blood-supply—a general plethoric condition of the system—on the other.

Congestive and Obstructive Dysmenorrhœa.

Predisposing Causes of Congestive Dysmenorrhœa.—Plethora; arrested or suppressed menstruation; inflammatory states of the uterus and endometrium; displacements of the uterus; subinvolution; fibroids; polypi.

Symptoms.—Pelvic pain frequently precedes the appearance of the menstrual flow, or continues during the period. It is generally aggravated previous to, and for the first twenty-four hours of, the discharge; the pain may be accompanied by constitutional disturbance. The uterus may be found swollen, tender, and sensitive both to external pressure and internal examination; on a vaginal examination with the speculum we frequently find the characteristic and exaggerated discharge of endometritis blocking up, or hanging from, the os uteri.

Predisposing Causes of Obstructive Dysmenorrhœa in the Ovaries and Fallopian Tubes.—Simple congestion, ovarian

apoplexy, acute ovaritis, morbid changes in the corpora lutea, cystic degeneration, cortical and interstitial sclerotic changes, gonorrhœal inflammation, cirrhosis, adhesions, morbid changes in the position or the lumen of the Fallopian tube, due to inflammations, adhesions, strangulation or cystic disease.

In the Uterus.—Mechanical obstruction to the flow of the menstrual discharge, due to stenosis of the cervical canal or os uteri; congenital malformations; uterine displacements which cause a narrowing and bending of the canal, and which favour interstitial effusions into the cellular tissue of the uterus, with resulting hyperplasia and contraction; traumatic—operative measures which result in stenosis; polypi and interstitial fibroids.

Symptoms.—The most prominent symptom is pelvic pain, varying in intensity, often agonizing, preceding and accompanying the menstrual discharge. There may be severe constitutional disturbance, violent headache, and sickness of the stomach. The mind may be weakened by the recurring agony, and delusion may follow, or the patient even become maniacal. Pelvic peritoneal symptoms are frequently present; and the onward passage of the blood being prevented, a pelvic hæmatocele may result. There are also commonly present considerable ovarian irritation, with pain and sensitiveness of the ovaries; neuralgic pains; attacks of uterine colic and spasm; hysterical tendencies. Vicarious hæmorrhage may occur elsewhere, as retinal infarctions and effusions, epistaxis, hæmatemesis or hæmoptysis; the blood becomes depraved; the patient is anæmic or chlorotic; the skin may have a yellowish-green or discoloured look. It may be that many of these symptoms are in abeyance until the increased sexual activity and local determination and excitement, consequent upon marriage, react on both the ovaries and uterus. Thus frequently we find the first great distress and pain complained of after marriage.

'*Spasmodic*' *Dysmenorrhœa.*—There is a variety of dysmenorrhœa which has been called spasmodic, and in which it is assumed that spasm of the uterine muscular fibres around the

isthmus uteri plays the most important part in the production of the pain. We have considered the symptoms associated with the term 'obstructive dysmenorrhœa.' I speak of 'obstructive' as distinct from 'atresic'—*i.e.*, more or less of mechanical obstruction to the menstrual flow due to congenital or acquired contraction, or partial occlusion of the uterine canal. I do not refer to atresia of any part of the genital tract, whether of Fallopian tube, uterus or vagina, or imperforate hymen. The two conditions must always, both for etiological and clinical considerations, be kept distinct. The congestive and obstructive forms of dysmenorrhœa touch each other closely, both from a pathological and clinical point of view. Congestion leads to obstruction. Impediment to free flow tends to congestion. Contraction of the uterine canal is a result common to both the congestion that follows a version and flexion, a hyperplastic effusion, a growing fibroid, and an inflammatory state of the endometrium. More of the nature of an obstacle to discharge is the presence of a small polypus. This possible, and indeed probable, cause of dysmenorrhœa is too often overlooked, and the step of dilatation and exploration of the uterus consequently is neglected—a step as beneficial from a therapeutic point of view as it is essential from a diagnostic. Traumatic contraction gives us the same results when it occurs from operative interference or rash therapeutical applications.

These varieties of dysmenorrhœa are, I think, rightly distinguished from that which is the consequence of stenosis associated with congenital malformation of the uterus, as recognised in the characteristic conical cervix and pin-hole aperture, or any of its varieties, or the imperfectly developed uterus with short cervix. Yet, as we are classifying a symptom, and not a pathological condition, we must be satisfied to include this frequently occurring misfortune under the heading of 'obstructive.' For my part, I prefer the classification as already given (p. 147).

Thus, uterine 'congestive dysmenorrhœa' would include

simple congestive conditions and plethoric states; 'obstructive,' such impediments as polypus and fibroid tumours, traumatic contraction; flexions and versions; 'inflammatory'—endometritis and metritis; 'congenital'—malformations causing atresia or stenosis of the os and cervix; and, quite apart from these, those circulatory causes found in anæmia, chlorosis, 'toxæmia' and other depraved conditions of the blood.

In the classification I have given, I have not included that form of dysmenorrhœa generally described as 'spasmodic.'

Every practitioner will, however, meet with cases of dysmenorrhœa in which he can find no satisfactory reason for the pain in any abnormal state either of uterus or ovary. Even if there be a version or flexion, he finds that the uterine canal is pervious; he rectifies the displacement, and still the pain recurs. There may be some congestion of the uterus, and ovarian tenderness, or hypersensitiveness of the internal os on passing the sound, yet not sufficient to explain the violent spasmodic pains that precede or accompany the earlier appearance of the menstrual discharge. We notice occasionally, as characteristic of this form of pain, that the patient states that some clots have passed, and that on the appearance of these the pain has been relieved. The passage of these clots may be ollowed by a profuse, or rather prolonged, flow. And this brings us to ask:

1. Is there such a distinct cause of the dysmenorrhœa in uterine spasm as to warrant our regarding this uterine contraction as a special form of painful menstruation, and either pathologically or clinically distinguishable from other forms?

2. Is it correct to assert that the pain has its *source* altogether in the uterine spasm, and not in the mechanical effects of congestive closure, contraction of the canal from flexion, or congenital stenosis?

The truth of the mechanical theory of the pain of dysmenorrhœa was altogether disputed by the late Matthews Duncan. His views may be summarized thus:

'The most characteristic form of dysmenorrhœa is spasmodic'; it is 'of the nature of a neurosis'; is synonymous with neuralgic, and is 'in its essence' due

to 'morbid contractions of the uterus, occurring in connection with menstruation.' These contractions are clonic; they 'come in pangs,' and when the pain is incessant it is because the uterine contraction is tonic. He regarded as analogous conditions the after-pains of pregnancy and spasmodic asthma. He laid down that 'nothing can be more erroneous' than the statement 'that flexion of the passage obstructs the discharge of blood.'

He thought that bad pathology which regards an extreme flexion as the cause of damming up of blood in the body of the uterus, and the usual consequences that follow from such blood accumulation. The fact that a woman has not violent dysmenorrhœa after the first two days of menstruation, as a rule, he considered subversive of the mechanical theory. Its periodicity and the influence of climate on the pain still further, he held, upset the obstruction theory. In short, he ignored the influence of flexion, version, pin-point os uteri, stenosis, in producing the dysmenorrhœa. If these views were correct, obviously much of the modern teaching is erroneous, and must be abandoned. I have to confess that I cannot agree with them, for the reason stated in the text.

There is a strong analogy between the pain in uterine obstruction and that which is, in the male, the result of urethral congestion, strictured conditions, and gouty urethritis. In the urethra, as in the cervical canal, it is not necessary that there should be any considerable contraction to produce spasmodic closure. We can pass a large-sized bougie through the urethra of a patient who a minute before could not void a drop of urine. The *pain* is the pain of retention rather than spasm. Even though there be recurrence of the spasmodic condition, when we overcome the obstruction (in this case both congestion and spasm) the pain disappears. Various degrees of flexion are at times to be met with in women who have never suffered from dysmenorrhœa. Take such a case as the following:

A lady, aged thirty-one, married nine years; had two early abortions shortly after marriage; has continued regular both in quantity and periodicity of discharge since; has never, since she was sixteen, been irregular, nor has she at any time suffered pain. Her husband, a medical man, induced her, for the first time, to submit to an examination to ascertain if there existed any cause for the sterility. She was a highly nervous woman. On examination, I found a rather sharp anteflexion of the uterus, which was evidently of old standing. The uterus was not enlarged, nor was it sensitive. The os was normal. Here the flexion had not caused congestion, nor obstruction, nor apparently any local derangement of the uterine nerves.

Then we have in men the irritation of a gouty blood current, causing spasmodic closure of the urethra, and producing

obstruction. It is periodical, and is relieved by change of diet and hygienic measures. But even if there be no considerable obstruction, and simply an abnormal condition of the tissues and nerves of a sensitive part, acute reflected pain may occur elsewhere. Witness severe urethral pain with hæmorrhoids, and remote pains in the extremities from stricture of the urethra. In asthma, instanced by Duncan, the pain or distress is distinctly caused by the impeded blood current, and we have to look altogether beyond the phenomenon of spasm for the primary cause of the obstruction. Doubtless certain uterine contractions are painful, but all are not so, as, for example, those which occur throughout pregnancy, and of which the woman is unconscious. These are purely physiological; they are not pathological, like those of dysmenorrhœa, or, for the matter of that, the after-pains of labour, in which we often have obstruction, and where there is a foreign body to be expelled. To neither can we apply the term 'morbid.'

In those exceptional cases in which we can, on examination, find no abnormal state to explain the dysmenorrhœa, we may feel certain that *it is for the simple reason that we have not been able to discover it.* The subtle relationship of ovary and uterus is sufficient to account for sympathies and reflex acts that we can find no physical explanation of. We must allow that it is the exception to meet with any severe case of spasmodic dysmenorrhœa without some attendant abnormal state of the uterus or ovary to explain it. Malformed cervix, contracted cervical canal, congenitally small uterus (one in which a healthful act of ovulation fails to find its external physiological expression in the proper menstrual flow), endometritis; a flexed hyperplastic and hypertrophied uterus, or one imprisoned by a cellular effusion, and various abnormalities in the size, feel, position, sensitiveness, of one or both ovaries or tubes—all are found associated with the spasm. For these and other reasons, which I do not stay to give here, I believe the term 'spasmodic dysmenorrhœa' to be misleading and unscientific. I still adhere to the opinion I have always expressed to students,

that spasm is an accessory symptom in most forms of dysmenorrhœa. That it accompanies the pain is true, but that it is the consequence of the various pathological states above referred to is likewise true. And when we come to ask what light treatment throws on the nature of this affection, I think every therapeutical step we take tends to prove the obstructive theory. The relief afforded by dilatation of the canal by tent or bougie, division of the cervix, and the posterior section of Sims, galvanism, suitable intra-uterine stems, or such medicines as apiol, castor, and various other therapeutic remedies, tends, I maintain, to support the older view that spasm is a symptom either of some morbid condition in the blood, nerve, or tissue, or a congenital, if not acquired, contraction of the uterine canal.

I believe that in suitable bougies we have the most perfect means of securing safe and rapid dilatation of the uterine canal. The bougies I have devised possess these advantages over Hegar's (see p. 77):

1. They are easier of insertion and of manipulation.

2. The momentum gained by the weight of the metal is of advantage.

3. They can be moulded to any shape at the will of the operator.

The time is approaching when for all similar cases tents, sea-tangle, and tupelo will be generally discarded for forcible dilatation. Still, there are cases in which the practitioner may not feel himself justified in resorting to the force necessary to dilate a small cervical canal. Here tupelo, or laminaria and subsequently tupelo, should be employed.*

General Treatment of Dysmenorrhœa.—In determining the treatment of any case of dysmenorrhœa, we must be guided by the cause of the pain, and our remedies should be such as

* *Dilatation Treatment of Dysmenorrhœa.*—The various dilators are shown at page 78. It is sufficient here to say that the treatment of dysmenorrhœa by dilatation has maintained the reputation it has been steadily gaining in recent years. I believe that dilatation is the *sine quâ non* of treatment in obstructive and congestive uterine dysmenorrhœa.

are indicated by the constitutional aspects of the case, and any local fault that we may detect. Our first aim should be to correct any constitutional vice, such as general plethora, anæmia, chlorosis, dyspepsia, gout, hysteria, constipated bowels, and those habits which lead up to depraved blood conditions and interference with the general health. Attention to all those matters already referred to in the instance of amenorrhœa will be necessary — climate, food, clothing, exercise, and abandonment of injurious amusements, occupations, or morbid excitements. Change of air, proper exercise, healthful and regular diet, with attention to the bowels, will cure many a case of dysmenorrhœa without further interference. With anæmic and chlorotic complications, the different chalybeates before referred to, and especially the combination of arsenic, iron, and quinine, must be tried. If we should be suspicious of a gouty diathesis (and 'latent gout' as a source of dysmenorrhœa should always be kept in view), the salts of potassium, lithia, soda, magnesia, are indicated, and these can be given with the bromides of potassium and ammonia, or with colchicum or guaiacum. The preparations 'piperazine' and 'uricidine' are specially of service. The salicylates of quinine, lithia, or soda (effervescing or granular) will be found agreeable and useful preparations. The combination of iodide of potassium, bromide of potassium, and bromide of ammonium, is most valuable. Amongst the English spas, those of Buxton, Bath, Cheltenham, Harrogate, and that of Strathpeffer, in Scotland, or one of the Continental waters, as Kissingen, Brides les Salins, Contrexéville (*vide* Spas), Ems, Bourboule, and Royat, may be tried. In atonic conditions of the bowels attended with flatulence, tincture of nux vomica in glycerine, and such carminatives as the compound tincture of chloroform or the spirit of lavender, will frequently relieve. In dyspeptic cases, if there be gastric acidity, the salts of bismuth in combination with carbonate of soda, papaine and pepsine, lactopeptine, or 'taka' diastase, are indicated.

Aperients.—For constipated bowels we should not hesitate,

if laxatives and mild purgatives fail to operate, to advise the occasional resort to enema. The pulvis glycyrrhizæ co. of the German Pharmacopœia, in doses of 30 grains to a drachm, may with advantage be given as a mild but effectual laxative in the mornings.

Glycerine enemata and suppositories are a valuable means of relieving the bowels. From ʒss.—ʒi. is administered by means of the proper rectal glycerine syringe. Oidtmann's purgative is a suppository of soap, glycerine, and rhamnus frangula. Glycerine suppositories made with cacao butter can now be had of any chemist, and of any strength desired. It is convenient to attach a narrow rubber tube to the small syringe, so that the patient can administer the enema lying on her back. I generally order equal parts of water and glycerine, ʒss.—ʒi. of each. In some instances I have had to abandon glycerine enemata on account of the pain they caused. Frequently they produce a burning sensation in the rectum.

Rubinat water is an excellent aperient. I find it acts well. Cascara sagrada tabloids (one or two) are given at night, the water being taken the following morning—three-quarters of a wineglass with a tablespoonful of hot water added. Sulphovinate of soda is a very valuable aperient for some women (especially during pregnancy). A dessert-spoonful is given with a teaspoonful of syrup of lemon, and half a tumbler of seltzer-water which is added from a syphon.

Of the natural waters, Hunyadi Janos, Æsculap, Friedrichshall, Pullna, Carlsbad, Victoria, are the simplest, and, if they act, the best saline aperients we have. They should be given early in the morning, and a little warm water (about a tablespoonful to the wineglass or two of Hunyadi Janos) added. The liquid extract of cascara sagrada is a very useful aperient—liquid extract of cascara, ʒi. ; glycerine, ʒi. ; water, ʒvi. (ʒss. as a dose). Generally, a small cup of warm tea or coffee, taken immediately after, will assist the action. A mild alterative or aperient pill can be taken the night before. With many, a tamar confection acts as an aperient. But habit has much to

say to constipated bowels, especially in women. We should insist on a daily effort being made, after breakfast, to relieve the bowels, and often a drink of cold water, at, or after, breakfast, will help. A moist pack, worn over the abdomen at night, made of a few layers of lint wrung out of tepid water, and covered with an oiled silk pad, I have frequently known assist the action of the bowels. So far as possible, we should avoid drastic purgatives, or encouragement of the constant use of every variety of 'aperient pill.' Some brown bread, softer food, fruit, and vegetables, with some simple assistance, as psyllium seeds, will generally obviate the necessity for so injurious a custom.

I could instance many cases of most obstinate costiveness in which forcible dilatation of the sphincters under ether has been followed by permanent cure.

A lady from Australia consulted me for constipation. During her pregnancy, four years previously, she was attacked with severe vomiting, when the constipation first became troublesome. She had ever since been relieved by enemata, and with difficulty; catamenia regular; there was a constant oppressed and uncomfortable feeling. On examination, I found the uterus healthy and in its normal position, the rectum loaded and hæmorrhoidal; there was a vaginal leucorrhœa. The following day, under ether, I forcibly, with my hand, dilated the sphincters. A few fibres of the external were ruptured; the rectum was emptied of its contents. An olive-oil enema was given the next morning. She was placed on cascara sagrada and a mild pill of belladonna and nux vomica, and from this to the day she left England, a period of four months, the bowel was regular, and she never used an enema.

This case is only quoted as an example of numbers I have most successfully treated on the same plan. This course may be assisted by the use of a galvanic current passed over the bowel and in the course of the colon daily. This is well supplemented by the use of abdominal massage.

If the pain be referred particularly to the region of the ovaries, and assumes a neuralgic type, the bromides of sodium, potassium, and ammonium are indicated. An excellent combination is that of bromide of potassium (gr. xv.), and hydrate of chloral (gr. xii.), given at intervals of four hours when the pain is felt. An enema of chloral and bromide of potassium

will be found of service. Tincture or extract of cannabis indica, tannate of cannabin, humulus lupulus, castor, lupuline, monobromate of camphor, apiol (in capsules), nepenthe or codeine at night, or the subcutaneous injection of morphia, are all of use to subdue the pain. Some of the legion of preparations of the coal-tar series may be tried—antipyrine, antifebrine,

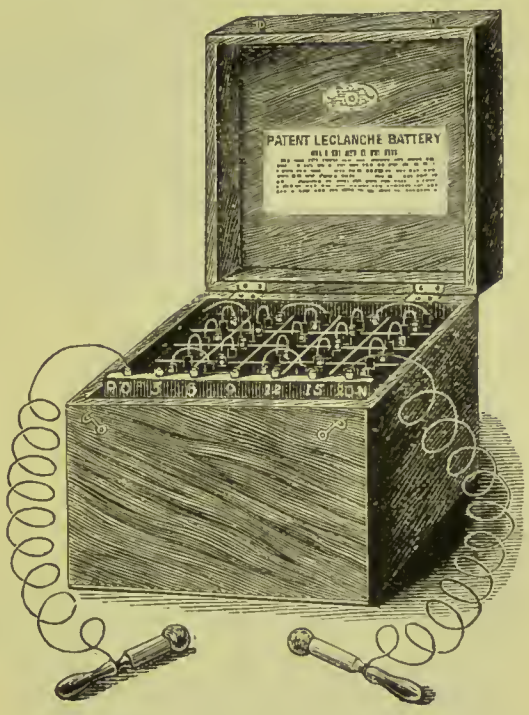


FIG. 134.—Leclanché's 20-cell Constant Current Battery. This battery is very simple, and should last for two years without renewal. The best form I know of is that of the Silvertown Company, London.

'analgen,' 'antikamni,' 'ammaonol,' all have been used with varied success. Sulphonal and trional are most valuable hypnotics, and in hysterical cases, as a rule, produce sleep. Chloralamid, in doses of twenty to thirty grains, has many advantages over other hypnotics; it has no after-effects.

Hysterical and Neuralgic Cases — Abuse of Morphia Injections.—There is a strong objection to resorting to the subcutaneous injection of morphia in hysterical women if we can possibly avoid doing so. Often a habit and craving is

encouraged, with all its pernicious consequences, and the symptoms of morphiomania may be developed. At the Gynæcological Society, March 14, 1895, I brought the subject of the abuse of morphia in gynæcological practice forward for discussion. I then entered fully into the influence of *temperament* on its action and effects; its physiological and psychical

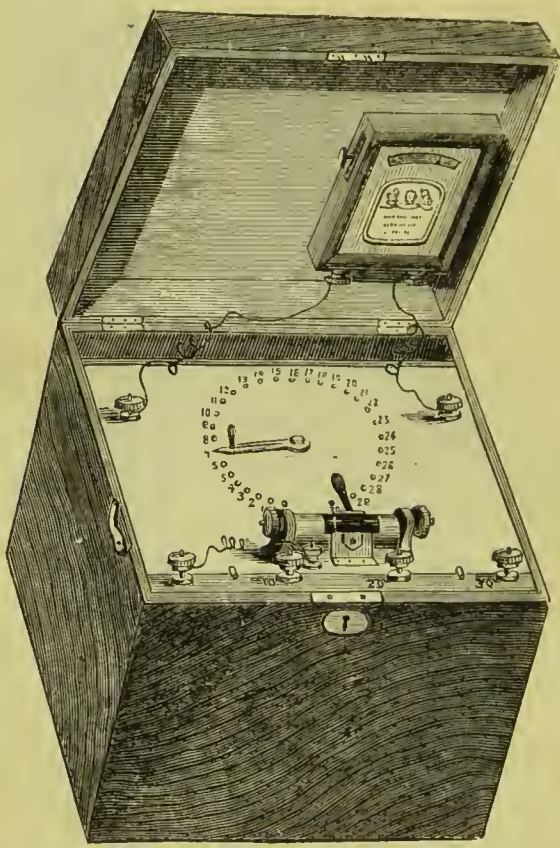


FIG. 135.—Portable Voltaic Battery for general application, 40 Leclanché cells, Accessories, Collector, Interrupter, Current Reverser, and Galvanometer (Coxeter).

influences; the precautions to be observed in its exhibition. The neurotic and lymphatic temperaments have been proved by all observers to be those most susceptible to the toxic effects of the drug. So far as its action on the catamenia is concerned, morphia used habitually has a tendency to arrest menstruation, and sterility is often a consequence. Also there are its effects on the embryo. One fact of greatest importance

stands out clearly in regard to morphiomania, viz., that the 'hysterical' temperament is the one occupying the foremost place in its causation. Hysteria, neurasthenia, neuralgia, cephalalgia, ovarian crises, spinal neuropathies, dysmenorrhœa, neurominesis, are the correlated conditions, often associated with sexual disturbances, which stand in the forefront of the etiology of morphia abuse in women. And they are, unfortunately, the very conditions for which it is most frequently prescribed.

'Such women are distinctly those that all experience has proved are most likely to be conquered by the physiological action of the drug. They are always importunate for its employment, once they have experienced its effects, and the weak-kneed physician is compelled to yield to their importunity. A prescription is given, possibly a nurse is entrusted with the administration, and very frequently, when the nurse leaves, the patient, retaining the prescription, not only administers, but practically prescribes, the medicament for herself. I have known a supply of two ounces of a morphia solution of the British Pharmacopœia obtained daily at different chemists', and thus as much as eighteen to twenty grains of morphia has been taken subcutaneously within the twenty-four hours. The prescription was copied at different establishments, and no demur was made to compounding it even after the lapse of five years from the date of the original order, nor was the physician who prescribed it made cognisant of the fact that it was so repeated. When, after considerable difficulty, the patient was cured of the habit, menstruation returned, and she conceived, there being an interval of eight years since her last pregnancy. When morphia can thus be readily obtained in large quantities, the tendency often arises for one woman to recommend its use to another, and even to go so far as to subcutaneously inject it into her friends. Thus the habit becomes contagious, and there is even a morbid delight felt in the act of puncturing, not alone herself, but others' (Régnier).

'Many of the affections of women which specially fall to the lot of the gynæcologist to treat are of a reflex nature, arising out of disorders of the uterus and its appendages, and are to be cured only by the restoration to health of the deranged pelvic organ. In the majority of such cases the morphia syringe is the most mischievous remedy to resort to. It may bridge over a period of time, but often this gain is achieved at the expense of the entire moral control of the woman, and her latent power to endure even trifling pain. I do not quote particulars of cases, but I can say that numerous women whom I have known to be addicted to the morphia habit owed their misfortune to what I could not but regard as the indiscriminate and too careless administration of the drug. In one case a lady of considerable refinement and culture had found her way into a private asylum, an eminent gynæcologist having permitted her to take morphia by the mouth at her own discretion, until at last she arrived at such quantities as would almost seem incredible. On leaving the asylum, where she had been cured, she still continued to fall back occasionally

on the use of the morphia ; and some years afterwards, when I saw her for a hæmorrhoidal affection, she handed me a small phial containing acetate of morphia in powder, confessing that she occasionally took it in varying quantities and without measurement. For some years she has been completely cured of the habit.

'One other point I will only make a passing allusion to, and that is the double-edged nature of this weapon when used by the surgeon after abdominal operations, in masking symptoms of peritonitis, and possible interference with the natural process of cure, through arrest of the secretions. As Greig Smith well says, "The routine employment of morphia is to be condemned. Complications are better met with a system unimpregnated with morphia."

'Categorically summarizing the different methods of healing the morphiomaniac or morphinises, there are :

'(*a*) Lewistein's method of "abrupt suppression," or sudden stoppage of the morphia ; this has been found to be dangerous, and did not answer.

'(*b*) The plan (Erlenmeyer) of gradual suppression, or reducing the doses of morphia by degrees, and extending this over some time.

'(*c*) The medium course of moderate suppression—or stopping the morphia gradually in the course of some eight to ten days. This plan may be combined with the use of various hypnotics. In one case urethrane answered well.

'(*d*) Alcohol has been tried as a substitute for the morphia. This has failed.

'(*e*) Chloral also has been tried and abandoned.

'(*f*) Opium itself has been tried, and other of its alkaloids, but they have not answered.

'(*g*) Nitro-glycerine and other drugs have been given.

'The treatment by suppression, combined with judicious control, diet, and the use of hypnotics, is the best plan to adopt. There is danger in deceiving the patient by the substitution of water for morphia, as, once discovered, it is apt to lead to a sense of indignation on her part, and a refusal to be again guided by her physician.

'Subcutaneous injections of atropine have been employed by W. Kochs, of Bonn, as an antidote to morphinism, to diminish unpleasant results of abstinence' (Author).

Paraldehyde in drachm doses may be tried, also chloralamid or urethrane in twenty to thirty grain doses ; but though useful as hypnotics, they are of little use to relieve pain. Locally, benefit may be derived from the constant current applied over the inguinal region, 10 to 15 cells of Leclanché's battery applied daily ; pigment of iodine with belladonna ; a combination of chloroform (℥iv.), extract of belladonna (℥ii.), tincture of aconite (℥iv.), camphor (℥ii.), mastich (℥iii.), rectified spirit (℥i.), laid on with a brush over both ovaries, or vesication over the ovary with a little chloroform applied on a watch-glass. But in every case of so-called 'neuralgic' dysmenorrhœa, we must

seek farther than the situation of the local manifestation for the cause of the pain. In the intervals between the periods, the closest attention must be paid to the general management of the case; any constitutional defect has to be rectified; tonics should be given, such as quinine, arsenic, bark, mineral acids, strychnine or nux vomica, the salts of zinc; chalybeates if the patient be anæmic; salines and mineral aperient waters if the tendency be to plethora. *The hysterical temperament* has to be met by such remedies as the bromides, in combination with valerian, assafœtida, or galbanum. Much may be achieved by correcting errors of diet and the abuse of stimulants, attention to exercise, and by giving the mind healthful occupation, with such agreeable outdoor recreation as circumstances will permit.* It is in these cases before all others, unless they be absolutely demanded by some local condition, that we should discountenance vaginal examinations, speculum introductions, and uterine manipulations. If there be in the unmarried girl a leucorrhœal discharge during the intervals between the periods, in a large proportion of cases it will disappear with appropriate constitutional treatment, aided by the vaginal douche, and some such astringent or alkali added to it as borax, alum, sulphocarbolate of zinc, carbonate of soda, or permanganate of potash. Should it not do so, or if in the first instance, from the severity of the symptoms or their persistence, we are suspicious of local disease or abnormality, an examination is justified; but I repeat that such a step is not to be unnecessarily advised or uselessly persisted in.

The same remark applies to those cases of married women, found floating about in such numbers, who have been to this doctor and that, who flippantly detail all the therapeutic means known for the cure of sterility and dysmenorrhœa, and appear to have exhausted the resources of imagination and art. The womb has been 'slit,' 'cut,' 'stretched,' 'replaced,' 'depleted,' not by one medical adviser, but by two or three;

* See remarks on Weir Mitchell's 'Rest Cure,' p. 181. Also chapter on Electro-Therapeutics, and treatment by Faradization.

yet they are none the better, but infinitely the worse, morally, mentally, and physically, for all this ingenious exercise of manipulative skill.

To restrain a woman from healthful intercourse, with proper intervals of rest, while she is made the victim of exhaustive vaginal explorations and pessary adjustments, appears to me to have in the practice neither reason nor justice. Erotic tendencies are sustained, and the whims and fancies of hysteria are encouraged.

Plethora.—If there be a plethoric state of the system, a few leeches over the ovaries, or about the anus, shortly before the period, and depletion of the cervix, will be indicated. When we can so cleanly, quickly, and efficiently deplete the uterus with the uterine lancet, we rarely need apply leeches to the womb itself. Every purpose can be served by puncturing. In these plethoric cases we derive benefit from salines, the various saline waters, occasional aperients, and close attention to diet and exercise. Iron has to be carefully avoided. Digitalis, with bromide and iodide of potassium, is a useful combination, or the tincture of strophanthus may in many cases be substituted for that of digitalis with advantage.

In congestive cases I have found the administration of a pill containing lupuline, ergotine, extract of cannabis (of each gr. i.), taken three times daily, alternating these doses with the bromide of potassium and chloral mixture, of service. In such obstinate cases we must be particularly careful in the use of stimulants. It is far better to insist on the total relinquishment of all alcoholic drinks. If the patient cannot be induced to abandon stimulants, we had better recommend some light wine, as claret, hock, or sauterne. The local means of combating dysmenorrhœa will be determined according to the state of the uterus with which, on examination, we find it associated. There may be a version or flexion requiring rectification, and the application of a suitable pessary. The canal of the cervix may be contracted, necessitating the use of a stem-pessary and the dilatation of the canal with the uterine bougies.

We can in a few days, commencing with the bougie of 11 millimetres, increase to 30 millimetres. If the stenosis be extreme, and the cervix conical, the best course will be to prepare our patient for the division of the cervix, and to perform this operation about ten days after the menstrual period has ceased. After division, the glass or celluloid stem may be worn, or the galvanic stem-pessary can be inserted in cases of congestion with scanty flow. Inflammatory states of the endometrium, should they be present, must be treated. When any polypus blocks the passage, or a uterine fibroid obstructs the flow, each has to be specially dealt with. The woman's life is rendered miserable by recurrent attacks of pain and intolerable suffering, especially if a growing fibroid implicate the canal. When all other means have been exhausted without any benefit, we should consider the advisability of removal of the appendages, placing fairly the exact risks of the operation before our patient.

In those cases of *ovarian dysmenorrhœa* in which the pain precedes the menstrual flow, and is characteristically ovarian, with sensitiveness and fulness in the ovary at either side—a fulness which can generally be felt through the vaginal roof or rectum—leeches applied either in the region of the ovaries or near the anus, vesication over the iliac region, warm sitz-baths, full doses of bromide of potassium or ammonium—are among the best means of obtaining relief.

I have seen some splendid results in these pitiable cases of chronic ovarian excitement, with various neurotic troubles—insomnia, loss of appetite, wasting, morbid fancies, and numerous reflex pains—from Weir-Mitchell's plan. The principles of his treatment are: 1. Rest and seclusion of the patient. This includes the exclusion of officious, meddling, and over-sympathetic friends; the assistance of an intelligent, refined, firm and judicious nurse and companion. If there be retroversion of the uterus, the patient is kept as much as possible in the prone or face position. This rest treatment must be continued for some weeks. 2. Change of diet. This

consists in feeding the patient with a light but nutritious and moderately stimulating diet, much in excess of the demand necessitated by the daily waste—principally milk at repeated intervals; soups; malt preparations (Horlick's malted milk will be found an admirable remedy); a wine, such as burgundy, hock, dry champagne; and other generous diet. 3. The administration of iron. 4. The use of massage* and electricity, a skilled masseuse carrying out the massage for the space of half an hour to an hour once or twice daily. Cocoa-nut oil is employed to assist the massage. The constant-current battery is used, or a mild Faradaic current applied over Ziemssen's points. Lastly, this treatment may be supplemented after a time by the use every morning of a tepid spinal douche, while the patient sits on a stool in a bath-tub with her feet in warm water. The water is poured over the back at a temperature of 80°, and is reduced one degree daily, until it is brought to the ordinary temperature. Suitable friction follows the douche, the patient dressing rapidly and after some food taking a brisk walk, which should not be of sufficient length to exhaust her strength or tire her.

In the admirable work on 'Diet in Sickness and Health,' by Mrs. Ernest Hart, these instructions are given:

'The patient should be weighed before being put to bed, and at frequent intervals during the treatment. She is first placed on a milk diet, and for the first day or two from three to four ounces are given every two hours. The milk may be slightly warmed, and, if it be particularly distasteful to the patient, it may be flavoured with a little tea or coffee. The quantity of milk taken is gradually increased, and the intervals lengthened to three hours, till at last two quarts are taken in the twenty-four hours. This rest in bed, and the simple milk diet, "nearly always dismiss," says Dr. Weir-Mitchell, "as if by magic, all the dyspeptic conditions" from which the patient had previously suffered. The circulation is at the same time stimulated, and the muscles undergo passive exercise by being kneaded by massage and moved by electric currents. The bowels are carefully regulated. After from four to seven days, a little solid food is taken, namely, bread-and-butter for breakfast, and a milk-pudding for dinner. A day or two later, fish and chicken or a mutton chop are added, first either to the mid-day or evening meal, and

* See chapter on Massage.

then at both. In about ten days the patient is put on three full meals daily, and the diet is as follows:

'Milk—sixty to eighty ounces.

'Breakfast—porridge and cream.

'Second breakfast—cocoa and egg, bread-and-butter.

'Luncheon—fish, bread, pudding, and milk, or chicken, vegetables, and pudding.

'Dinner—mutton or beef, two or three kinds of vegetables, milk pudding, or stewed fruit with cream.

'Extract of malt may be given with one or more of the supplies of milk, and in some cases cod-liver-oil is also prescribed.'

Membranous Dysmenorrhœa.

This is not a common affection. Here we have exfoliation of the uterine mucous membrane, either in the form of shreds, or sometimes as a complete cast of the uterine cavity in which are the orifices of the Fallopian tubes or os uteri. Some years since I had a lady, a virgin, under my care who suffered most severely at the menstrual periods, and had always done so. Before marriage, however, she had passed these casts of the uterus, and this continued for the first year after marriage. The little membranous exfoliation preserved completely the form of the uterine cavity. The affection yielded in time to treatment; she became pregnant and had a family. This form of dysmenorrhœa is not necessarily related to conception. It does not of necessity cause sterility, though as long as the affection persists it predisposes to this condition. Microscopically, the membranous layer is found to be composed of connective-tissue, glands, and deciduous cells.

In two cases reported by Mansell-Moullin, the structure of the membrane was shown to consist of 'large fusiform and rounded cells, many of which appeared to have two nuclei, as if undergoing proliferation, containing utricular glands lined with columnar epithelium of large size, and numerous blood-vessels of different calibre.' The passage of the membrane is not always accompanied by pain. There is frequently associated with this form of dysmenorrhœa a degree of chronic inflammation of the uterus. We must not confound this membranous cast with an exfoliation or a blood-coagulum. The

microscope and a little care will prevent this error. Hitherto neither the abortive evolution theory of Sir John Williams, nor any other, has satisfactorily explained the causation of this affection. If we hope to alter the character of the menstrual act radically, we must change the nature of the uterine mucous membrane. The most energetic treatment consists of dilatation of the uterus by means of tent, the use of the curette, and the subsequent application of chromic acid to the endometrium. Inflammatory complications are subdued if they exist. The interior of the uterus should be treated during the intervals between the periods by such remedies as fused nitrate of silver or sulphate of zinc points, nitric acid, iodine, ichthyol, or carbolic acid. If the pain be severe during the separation of the membrane, chloral and bromides, opiate suppositories, vaginal pessaries of belladonna and morphia, morphia injected subcutaneously, will give relief. It is better, while the patient is under treatment, to forbid coitus. Galvanism may be used to the interior of the uterus in the following manner:

Electrolysis in Dysmenorrhœa. — Dilatation by electrolysis has answered well in several reported cases. The positive sponge rheophore is placed over the abdomen, and the negative electrode is introduced into the uterus through the internal os. The sitting lasts from ten to twenty minutes (Fry). Six small Leclanché cells are used.*

General Therapeutics.—I have before referred to the remedies *aletris*, *pulsatilla*, *viburnum*, *apiol*, *castor*, and *oxide of manganese.* I have given with great benefit antipyrine, phenacetine, and antifebrine, and the patent combinations antikamnia and ammonol, in those cases of an undoubtedly neuralgic type; especially have they proved of service when there have been associated neuralgic pains in the sides, groin, and legs. The doses I have given of them have been from 7-10 grains, repeated every few hours.

In rheumatic dysmenorrhœa the *salicylate of soda* or *salol* in combination with *guaiacum* may be tried.

* See chapter on Electro-Therapeutics.

Oxalate of cerium has been recommended by Chambers. He gives it in six-grain doses to healthy women who suffer before the period and during its onset.

Sulphonal.—I have frequently administered sulphonal as a hypnotic in cases of dysmenorrhœa. In doses of 25 to 30

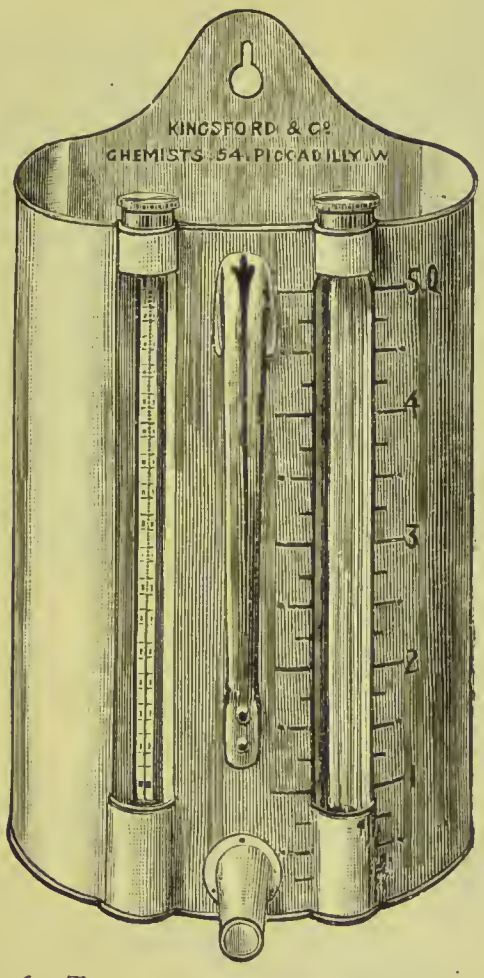


FIG. 136.—Temperature and Water Gauge Douche.

grains it generally gives several hours of good sleep. It should be ordered a few hours before sleep is desired. It may be given suspended in a little compound powder of tragacanth and the compound almond mixture. Chloralamid may be taken in doses of 20 to 30 grains, and is, as already stated, a valuable hypnotic. The patent combination 'Bromidia' answers well in other cases.

CHAPTER VIII.

DISORDERS OF MENSTRUATION (continued)— MENORRHAGIA, METRORRHAGIA, LEUCORRHŒA.

HÆMORRHAGE.—I have already given a brief classification of hæmorrhage, whether as a simple exaggerated menstrual flow, or that which occurs independently of menstruation, due either to disease in some other organ than the uterus, or having a strictly local origin. In dealing with any case of uterine hæmorrhage some broad practical rules have to be remembered. I should say in their relative order of importance they are as follows :

1. Never neglect or trifle with, by simple palliative measures, an unusual, continuous, or exaggerated loss of blood from the uterus.
2. Always remember that the hæmorrhage is but the sign of some abnormal condition elsewhere, or of disease in the uterus itself.
3. *Attend to the cause of the hæmorrhage, and in case of doubt make a careful vaginal examination ; should this not explain the cause, and the hæmorrhage continue, dilate the uterus and explore its cavity.*
4. Once the cervix is dilated, maintain a certain degree of dilatation, as long as the discharge of blood should continue.

The local conditions most frequently met with which cause hæmorrhage are: Fibroid tumours, subinvolution, endometritis and cervicitis, erosion of the external os and cervix, granular

states, malignant disease, polypus, uterine congestion associated with flexion, and ovarian congestion.

Our treatment of hæmorrhage may be divided under two heads: (1) Attention to any organic disease in the heart, lungs,

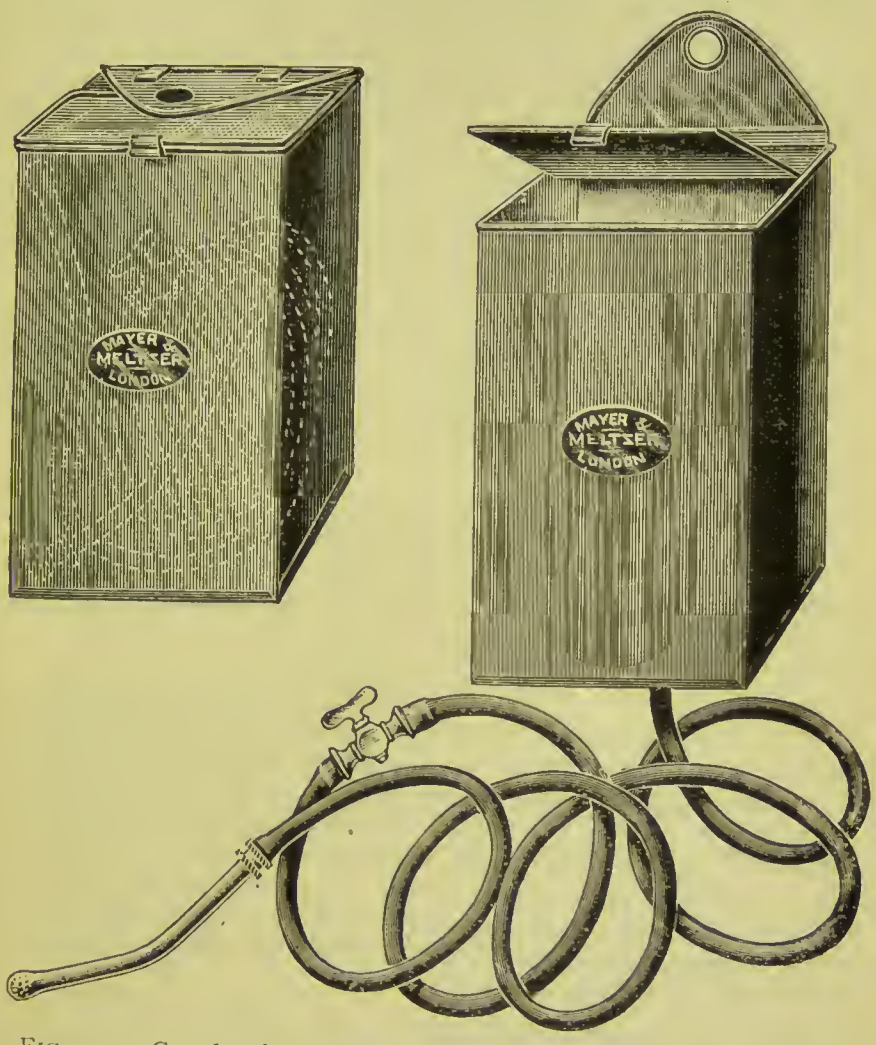


FIG. 137.—Can douche and tube of author. This can is convenient for packing.

liver, spleen, kidney; the control of excessive discharge during the exanthemata, in purpuric states, at the climacteric period, or after prolonged lactation. (2) The removal of the local cause by operation or other local treatment.

It is not my intention in this place to enter into the different

means of checking hæmorrhage, as this is necessarily done when detailing the treatment of the various morbid conditions that give rise to it. But it may be well to tabulate the most useful and efficacious hæmostatics and astringents we possess :

1. *Heat.*—By the vaginal douche and water at 110° to 120°.

The can (Fig. 137), filled with water at the required temperature, is hung on a nail or a hook of a bed-curtain ring (or placed on the top of a wardrobe) about 8 feet high. The patient (in the horizontal position, if possible) inserts the tube, directing it backwards into the vagina, and by turning the cock the water flows. The can ought to be larger than those usually sold, and should contain 2 quarts. It is preferable to have the assistance of an attendant or nurse. Tincture of iodine, Kreuznach liquor, Woodhall Spa water, boracic acid, bicarbonate of soda, borax, Condy's fluid, liquid extract of hydrastis, may be added to the water.

I think the admonition of W. Goodell, with regard to this hot douche, contained in his paper on 'What I have Learned to Unlearn' (*Medical News*),* of the greatest importance, and it is one in which I fully concur :

'My experience teaches me that, save in some cases of active congestion or of acute inflammation of the pelvic organs, the hot douche is of questionable utility, and that its indiscriminate employment has done far more harm than good, especially when continued for any length of time. I cannot withhold the opinion that from its use ovaritis, salpingitis, and peri-uterine inflammation have actually been set up by the over-heating and the subsequent chilling of the pelvic organs. The crucial test of surgical research, which cannot be gainsaid, has shown that cellulitis is almost a myth, and that what have been deemed exudation tumours and inflammatory deposits in the areolar tissue, are tubal and ovarian lesions.'

2. *Cold.*—Vaginal douche ; ice-bag in vagina ; irrigating tube in vagina ; ice-bag or bladder over pubes. Cold is always to be used with caution where there is great debility or tendency to collapse. Leiter's tubes may be placed over the uterus.

3. *Tampon.*—This may be in the form of a sponge-tent inserted into the cervix—the sponge acts both as a dilator and plug.

* *Provincial Medical Journal*, vol. x., p. 243.

Vaginal Plug.

In many cases of hæmorrhage from the cervical neck, after operation on the cervix, in granular states, and after depletion, we can make a convenient and efficient plug thus: A roll of salicylic acid wool is tied in the centre with a string, and spread out umbrella-shape; several smaller pieces of wool are at hand. Moisten the surface of the wool with a little perchloride or the subsulphate of iron solution, extract of hamamelis or hydrastis, glycerine and carbolic acid, glycerine of tannin, or glycerine and permanganate of potash solution. A Sims' speculum is introduced. The medicated wool with the string attached is now pressed home against the os—it is better to first dry the part thoroughly—and following it the smaller pieces of wool are pushed in, until the upper part of the vagina is well filled. I always remove such a plug after twelve hours. If we want more securely to fill the vagina, we may use strips of lint in the form of a 'kite's tail.' The lint may be moistened with carbolized water, perchloride of mercury (1 in 10,000), or permanganate of potash solution. If separate rolls of wool or lint be used, the strings should be knotted once, twice, or three times, according to the order in which they are inserted. This will indicate the string to remove first.*

Two rules are to be always borne in mind in regard to plugging: (*a*) Never look upon plugging save as a temporary expedient for the control of hæmorrhage; (*b*) never permit a plug to remain for a longer period than twenty-four hours at the outside in the vaginal cavity, and always disinfect and cleanse the vagina after the removal of the plug and before a second is inserted.

4. *Such Local Therapeutic Agents may be used as:* alum, in tampon or injection; persalts of iron, perchloride of iron, either as the liquor, or, what is far preferable, the solution in water of the solid salt, made any strength (grs. xxx. ad ℥i.); sulphate of iron solution (℥ss. ad ℥i., Sims); ferro-alumen; gallic acid; tannic acid; matico in injection; hamamelis. The interior of the uterus may be thoroughly wiped with any of these agents. Vaginal tampons of glycerine, and liquid extract of hydrastis with tincture of matico, are very efficacious.

5. The more powerful *general therapeutic remedies* are ergot; ergotine, or sclerotic acid, given subcutaneously; ergotine,

* If the object be to first fill the space of Douglas, the better plan is, to place the woman in the knee-elbow position and fill the posterior cul-de-sac with several small tampons, moistened with a disinfectant.

with lupuline and quinine, given in pill; tincture of perchloride of iron: infusion of matico, alone or in combination with perchloride of iron, gallic acid, tincture of digitalis, or extract of hamamelis; digitalis, in combination with ergotine, dried sulphate of iron and quinine; gallic acid (gr. xv. doses), with infusion of matico and liquid extract of ergot, or the ammoniated solution of ergot; quinine, with aromatic sulphuric acid or dilute sulphuric acid.

Hydrastis Canadensis.

The therapeutic value of *hydrastis canadensis* has been abundantly proved during the last few years. The alkaloid *hydrastia* ($C_{21}H_{21}NO_6$) I have used largely for menorrhagia and metrorrhagia. For this purpose Messrs. Burroughs, Wellcome and Co. have prepared for me tabloids of hydrastia muriate (gr. $\frac{1}{4}$), ergotine (gr. $\frac{1}{2}$), cannabin tannate (gr. $\frac{1}{2}$).* One or two of these tabloids may be given three times in the day as a dose.

The white alkaloid hydrastia melts at 116° C., being soluble in alcohol, ether, and chloroform. The investigations of Fellner (*Lancet*, August, 1884) into the physiological action of the extract of hydrastis, when injected directly into the veins of dogs, showed that there was, following a momentary rise, a dangerous, if not fatal, fall in the blood-pressure. When injected hypodermically a similar fall occurred. But if smaller doses than 1·2 to 1 gramme were injected, the primary effect was a decrease, followed by a decided elevation of blood-pressure. A number of injections of small doses caused the same results as a large single dose, and this was the case if the drug were given by the rectum or stomach. Nor did the previous section of the splanchnic nerves or compression of the abdominal aorta, or section of the cervical portion of the spinal cord, arrest the lowering of the blood-pressure. Inspection of the intestinal vessels during this period of lowered blood-pressure showed them to be injected; but this condition was followed by an ex-sanguineous one, when the pressure was again raised. The pulse is slowed during the first stage of its action. But this slowing of the pulse does not occur when the pneumogastric nerves are divided. If large doses of this drug were injected, and the action passed on to the second stage, previous division of the vagi had no effect on the pulse. Strychnia to some extent counteracted the effects of hydrastis on the blood-pressure. All injections caused uterine contraction, in the first instance of the body and cornua, later on rather of the cornua, these contractions being synchronous with the vascular contractions. Falk ('Therap. Monat.') believes that hydrastia in large doses has a decidedly tetanic action, and paralyzes the heart. All these investigations tend to prove that hydrastis powerfully affects the vaso-motor nerves, and causes excitation of the cerebral centres. The ultimate result Falk believes to be vascular expansion and increase of blood-pressure. The alkaloid hydrastinin is much more satisfactory in its action than the extract, but the great cost of its preparation is prohibitory of its general employment.

* To this combination I have lately added *stypticine* (gr. $\frac{1}{4}$).

The clinical indications for the employment of hydrastis are to be found especially in those various atonic vascular states of the uterus, occurring at any period of active menstrual life, some of which are attended by excessive loss of blood, either of the menorrhagic or metrorrhagic type. Also it is of benefit in those cases of congestive dysmenorrhœa in which we find frequently the severest degree of menstrual pain, though the loss of blood is excessive. My experience quite confirms that of Goth (*Lancet*, February, 1887), that it is especially in hæmorrhages of the menopause, provided there be no organic changes in the uterine tissues, nor intra-uterine growths present, that the value of hydrastis is best seen. I speak more especially of its internal use. I combine with the hydrastis such remedies as ergot, or ergotine, sclerotic acid, cannabin, digitalis. And it was with a view to the administration of these drugs in a convenient form that I had the tabloids I have referred to prepared. Hydrastia and sclerotic acid will be found most useful in vicarious hæmoptysis and in epistaxis (in the latter the extract may be used with glycerine and tincture of matico most efficaciously as a local styptic or on a tampon). In chronic hyperplastic conditions, in the earlier stages of uterine subinvolution, in the 'secondary hæmorrhages' (McClintock) that follow abortion, miscarriage, or labour, hydrastis in combination with other astringents will be found valuable, both administered internally and applied locally. I have many times tried both the tincture, extract, and alkaloid in various forms of myomata. The results have been generally disappointing. There have been some modification and partial control of the bleeding occasionally, but no permanent nor marked relief.

Stypticine as a Uterine Hæmostatic.—I have lately added stypticine to the hydrastia tabloids, Gottschalk's experiments having shown the value of this alkaloid in the treatment of uterine hæmorrhage. It is one of the oxidation products of narcotine. The dose of stypticine is 0·05 gramme, four or five times in the day. It combines a sedative with its styptic

action. Gottschalk uses it as an adjuvant to the curette. It must be remembered that it is an exciter of uterine action, and hence is contra-indicated in threatened abortion. It is a powerful vaso-constrictor. The hæmorrhages in which it proves of most service are those due to uterine interstitial fibroid, and in menorrhagia due to subinvolution.

In those cases of atonic dyspepsia and general debility, so commonly met with in women who have suffered from menorrhagia from any cause, especially those who have lived in the tropics, the tincture of hydrastis will be a valuable adjunct to other remedies, particularly if there be cardiac weakness accompanying the dyspeptic state or loss of appetite. In such cases, in union with the vascular tonics, digitalis, convallaria, and strophanthus, the tincture of hydrastis, if there be deficient cardiac systole and rhythmic irregularity, is a very good combination. In my earliest contribution to periodical literature. I urged the therapeutic value of digitalis in uterine hæmorrhage as indicated by its physiological action. It is especially in such cases as those just alluded to, in which we find ventricular incompetence, that this drug acts well with hydrastis when the system is generally enfeebled by repeated, erratic, and excessive loss of blood. The value of strophanthus in dysmenorrhœa has been pointed out by different gynæcological authorities, and its use in cardiac incompetence is established. The uterine hæmorrhage which is associated with aortic disease is most troublesome to treat. Here strophanthus is specially indicated. It has the disadvantage, as compared with digitalis, that we are not so certain of its action in causing contraction of the arterioles, and its effects are not of so permanent a nature. But in those cases of menorrhagia and metrorrhagia associated with cardiac, functional, or organic lesions, occasionally attended by dysmenorrhœa, the administration of hydrastis and strophanthus will be found of great service, and there is no objection to the addition of ergot. Strophanthus in such cases has this advantage over digitalis, that it is better tolerated when administered for any length of

time. Hydrastis is a valuable adjunct to the uterine tonics, aletris farinosa, and 'celerina,' and I have frequently given these drugs together with great benefit. The same may be said of the combination known as 'aletris cordial.' In passing, I may bear testimony to the great benefit I have frequently seen follow the use of both these remedies in uterine affections, the combination 'celerina' (celery, coca, kola, viburnum, grs. v.—ʒi.) being a capital tonic for women who have suffered from uterine losses. The local use of hydrastis in uterine affections is as important as its internal administration. The fluid extract is the preparation most suitable for topical application. I have for several years used it in common with other applications, or added to these, in cases of chronic endometritis, in cervical (bleeding) erosions, and after scarification of the cervix for congestive states of the uterine cervix. I usually combine it with ichthyol solution (20 per cent.), carbolic acid or iodine, adding equal parts of glycerine.

As a cervical dressing it will be found of service applied on the vaginal tampon, either alone or with one of the above-named additions. The tampon, first soaked in glycerine and shaped, has a little hydrastis extract, or the compound preparation, poured on the surface, and is easily applied at night by the patient herself. A patient should be taught how to properly apply a tampon. In many instances it might as well be left on the toilet-table. In cases where the use of the hot douche (110° to 120°) is called for, the liquid extract of hydrastis (ʒii.—ʒiv.) may with benefit be added to the water contained in the quart can. These local uses of hydrastis or its alkaloid are most necessary additions to the internal administrations of the drug.

The general management of the patient suffering from menorrhagia will depend on the constitutional state on which the hæmorrhage is attendant. General or ovarian excitement may be controlled by bromides. In atonic states, strychnine, in combination with quinine and iron, is indicated. If the debility induce hysteria, valerian (ammoniated tincture and

infusion) is an admirable addition to the bromide preparations. In plethoric conditions, at the time of the menopause, and if there be any hepatic congestion, saline purgatives, bitter waters, vegetable cholagogues (podophyllin, iridin, euonymin), alternated occasionally with a mild mercurial, as a few grains of calomel or gray powder, should be given. If loss of blood should have induced an anæmic or chlorotic state, iron should be judiciously administered in any of the forms already mentioned, the dialyzed preparation of Squire's, Fellows', Easton's, or Dusart's syrups, Flitwick iron water, Blaud's pills, the perchloride, tincture and the chloroxide, being excellent forms to administer it in.* Hæmoglobin in the form of Pfeuffer, Munich, is a capital remedy.

Leucorrhœa.

Of all terms used in gynæcology, this one—leucorrhœa—is employed in the loosest and most misleading manner, both by student and practitioner. By leucorrhœa we understand generally, in practice, what women call 'the whites.' If we restrict the use of the term to simple exaggeration of the normal secretions, whether coming from uterus, vagina, or vulva, or to some catarrhal state of the mucous membrane, it would be, perhaps, correct to speak of uterine (corporeal and cervical), vaginal and vulvar leucorrhœa. But it must be remembered that simple excess of the normal physiological secretion rarely continues for a length of time without inducing pathological changes in the tissues, which are quite distinct from a slight perversion or simple exaggeration of secretion. Such a correctly styled 'leucorrhœal flow' we meet with, typically, in pregnancy, in young girls with debilitated constitutions, and in those suffering from anæmia. To mix up the idea of any pathological change in the tissues with ordinary leucorrhœa is simply to lead the practitioner into errors both of diagnosis and treatment. On the one hand, he may resort to unnecessary exami-

* For the treatment of menorrhagia by Electricity, see chapter on Gynæcological Electro-Therapeutics.

nations, overtreat by local measures, apply topical agents to healthful structures, or raise unnecessary alarm. On the other, he may be tempted to pursue an expectant plan of treatment, hoping in vain that he can control a discharge which has its source in some diseased state of the uterus, by palliative measures and general constitutional remedies. I confine my observations to leucorrhœal discharges proper.

I have already, in the table of discharges, epitomized the distinctive features of the secretions poured from the uterus—body or cervix—the vagina and vulva. In some cases simple leucorrhœal discharge is very profuse; perhaps it altogether supplants the normal menstrual function. This form of discharge we are frequently consulted for in connection with either amenorrhœa or some irregularity of the menstrual flow, and its accompanying anæmic or chlorotic condition. We also meet with it as a symptom in gouty, rheumatic, syphilitic, and tubercular constitutions. In leuco-phlegmatic children, occasionally—apart from the discharge of vaginitis—after the exanthemata, or associated with worms, and during dentition, we find a true leucorrhœal discharge. Though in anæmic or chlorotic girls a vaginal examination is generally unnecessary, much careful discrimination has at times to be exercised.

There is such a contingency as the following: A very intelligent young practitioner brought to me an unmarried girl (accompanied by a married sister), suffering from amenorrhœa, with attendant anæmia, gastric symptoms, leucorrhœa, flatulence, etc. She had taken various remedies without avail. No examination had been made. I hinted at the possibility that she might be *enceinte*, but was assured it was out of the question. The chances of a flexion or version being present suggested a digital examination. I was surprised to find the girl far advanced in pregnancy. Insisting, then, on making a complete examination, we were satisfied she was at least in the eighth month of pregnancy. She had so laced and dressed as to deceive all about her, including her mother, married sister and physician. The story tells its own moral.

More recently I was asked to see a lady who asserted that she never had, from his inability, complete intercourse with her husband. She complained of her general health being impaired as a consequence, and of the presence of a tumour. I found a yielding but unruptured hymen. She was exceedingly nervous lest I should destroy the proof, by examination, of the incomplete nature of the conjugal act. On placing my hand on her abdomen my suspicions

were aroused. I examined her breasts, and found in them milk. She insisted she was not pregnant. I could not hear the fœtal heart. But despite the presence of the hymen, I was confident of the pregnancy, and so gave my opinion to her solicitor. She was in due course delivered of a living and healthy child.

When, from other symptoms, we are led to suspect some inflammatory condition, or a version or flexion, a digital examination is called for. In a married woman it is the safest course to examine the uterus when we are told that she 'suffers from the whites.'

Our treatment has to be determined by the general aspects of the case. The different modes of restoring the general health, by chalybeates, tonics, attention to diet, and exercise, already pointed out in the treatment of amenorrhœa, must be resorted to.

As to local measures, we may do much by the vaginal douche, astringent and alkaline injections, more especially those of alum, sulphate of zinc, sulpho-carbolate of zinc, borate of soda. In children we must pay attention to the general health, and give some alterative, as small doses of rhubarb, hydrarg. ē creta and quinine; also, the various chalybeates—a course of syrup. of iodide of iron, Fellows' syrup, or Parrish's food. The child's diet should be regulated, and she should have proper baths, sea-bathing, and warm underclothing.

Simple uncomplicated leucorrhœa rarely produces irritation of the vulva, pruritus, or eczematous inflammation, while we frequently find such conditions attendant upon vaginitis and discharges of a purulent or acrid nature, both from the uterus and vagina. (See 'Vaginitis.') In children, however, scrupulous cleanliness should be enforced, and the vulvar orifice inspected regularly, lest there be any irritation consequent upon the discharge.

CHAPTER IX.

UTERINE DISPLACEMENTS.

Principal Predisposing Causes of Uterine Displacements.

General debility, inducing relaxation of uterine supports.
Pregnancy and labour—ruptured perinæum—laceration of cervix.
Pelvic adhesions—peritonitis and cellulitis.
Pelvic effusions.
Vaginal prolapse.
Violent muscular efforts.
Congested states of the uterus.
Distension of rectum or bladder.
Fibroid tumours of uterus.
Abdominal tumours—collections of fluid.
Subinvolution—areolar hyperplasia.
Imprudent habits of dress—tight-lacing—too tight binding after labour.
Sedentary occupations.

Important Displacements.

Anteversion and anteflexion.
Retroversion and retroflexion.
Prolapse.
Ascent.
Inversion.

Some Results, Direct and Indirect, of Uterine Versions and Flexions.

Dyspareunia (painful coitus).
Amenorrhœa.
Dysmenorrhœa.
Menorrhagia and Metrorrhagia.
Uterine congestion.
Uterine hyperplasia.
Uterine fibroids.
Stenosis and sterility.
Uterine prolapse and vaginal inversion.
Vesical irritation—incontinence—retention.
Rectal irritation—constipation—hæmorrhoids.
Rectocele.
Perimetritis.
Pelvic phlegmon.
Hæmatocele.
Locomotor troubles.
Sacral and lumbar pain—neuralgia.
Various reflex pains.
Abortion.
Ovarian congestion—ovaritis—salpingitis.
Ocular derangements.

Anteversion.

The uterus lies, in the normal condition, slightly anteverted in the pelvic cavity (Fig. 138). Owing to pressure from above, or posteriorly, or from the yielding of its supports, above, below, or at the side, or from contractions or adhesions which drag on it anteriorly, the fundus uteri is thrown further forwards in the pelvis. Ultimately it is so far displaced from its proper relation to the pelvic brim that it rests against the bladder, while the os uteri is carried back towards the pouch of Douglas. As we might suspect, from the normal inclination of the uterus, and the influences which operate in producing

the first exaggeration of it, we find this the most frequent of uterine displacements. So, where it is met with in its worst form, is it most distressing to the patient, and most difficult to relieve.

Any of the affections I have just grouped as consequences of displacements may result from extreme anteversion. Those that are found as the most frequent attendants on it are—amenorrhœa and dysmenorrhœa, uterine congestion, uterine fibroid, stenosis, sterility, vesical and rectal distress, uterine prolapse, locomotor symptoms, sacral and lumbar pains, ovarian congestion, and ovaritis. *It is a safe maxim in gynæcological*

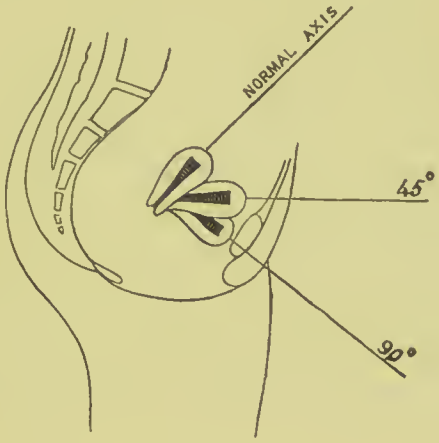


FIG. 138.—Degrees of Anteversion.

practice to look outside the bladder itself for the cause in any case where there is difficulty before or during the act of micturition, or evidence of retention of urine. We shall very frequently find it in an anteflexed or retroverted uterus. In like manner, when there is tenesmus, or a sense of pressure in the rectum and general rectal distress, with the passage of fæces which are in form suggestive of stricture, we may discover the cause in uterine displacement.

Diagnosis.—If we suspect the malposition, there is no difficulty in quickly verifying our suspicions. *We might, if careless, confound both anteversion and anteflexion with a fibroid of*

the uterus, or a vesical tumour; but we are more likely to overlook the pathological condition attendant upon, and which has frequently preceded, the version—as, for example, an *intramural fibroid, subinvolution of the uterus, simple hypertrophy, an intra-uterine polypus, adhesions, metritis or perimetritis.* While we may therefore prove satisfactorily that the uterus is anteverted or anteflexed, we must, by careful measurement with the sound, and searching digital and bimanual examinations in the manner previously described, exclude any possibility of such complications being present. By digital examination, the absence of the cervix from the fornix of the vagina, its position posteriorly in the sacral hollow, and the detection anteriorly of the hard fundus, less so in the dorsal decubitus, will show that the uterus is anteverted. By abdomino-vaginal examination we can get the entire organ between our hands, and satisfy ourselves that this mass which is felt anteriorly is the fundus uteri. If there should be still a doubt or suspicion of other complications, it may be necessary to complete the diagnosis with the sound. I again repeat here the obstetric axiom—Do not take the uterine sound in hand in any case in which there is a suspicion of pregnancy. Most necessary is it to recollect this rule in the instance of an enlarged and anteverted uterus. Should the possibility of pregnancy be excluded, more especially if we desire to use the sound both for a diagnostic and therapeutic purpose, we may pass it. This, at times, is not such an easy operation. It may be difficult, even when the sound is well curved, to get it into the os uteri in extreme anteversion. Some old flexion may impede its progress; so may also a uterine growth. The important lesson we must learn is, to use no force in the attempt. By carrying the handle well back, or by giving the instrument various degrees of curvature, we shall succeed by gentleness, and not by force.

Treatment.—In making our diagnosis, we determine the degree of mobility of the uterus, or the extent to which it is fixed in the pelvis, or bound down by adhesions. We can,

with the fingers of the right hand carried deeply behind the pubes, press upwards and backwards the fundus, while, at the same time, we steady the cervix with a finger of the left hand in the vagina, and draw it forwards. Should the uterus be so fixed that we cannot succeed in this manœuvre by the fingers, it is seldom that we can safely effect much greater permanent improvement in position by the sound. Recollecting the etiology of anteversion, it is obvious that the mere reposition of the uterus is frequently the least part of the practitioner's duty. The general health of the woman must be carefully attended to, and her secretions regulated; congested and hypertrophic conditions of the uterus, contractions of the cervical canal, any complicating tumour or effusion, ought, as far as possible, to be rectified, and any abdominal pressure relieved. In the meantime, we endeavour to raise the fundus uteri, and retain it in position by a pessary.

It must be clearly understood that these remarks refer to an extreme degree of this form of uterine displacement.*

I agree in the main with the opinion expressed by Matthews Duncan in his lecture on '*Minor* Displacements,' especially where he says that, were some modern doctrines well founded, 'life for women would not be worth the having, for the position of no womb satisfies those who entertain them, and treatment has as its ordinary consequence failure and disappointment, and sometimes grave disaster.'

It is absurd to see the array of anteversion pessaries still figured in every instrument-maker's catalogue. When every-day experience teaches us that every kind of pessary, *in cases of anteversion or anteflexion*, frequently fails to give relief, and often only creates distress; when the truth of the statement cannot be controverted, that 'thousands of blooming, happy, fertile women have displacements';† when we consider that we are frequently creating an unhealthy state rather than relieving it —we shall hesitate before we talk to women of the womb being 'displaced,' and still more so before we place in the vagina for this variety of uterine displacement a pessary of any kind. It is deplorable, the extent to which the charlatanism of

* Sec p. 202. † *Ibid.*

pessary adjusters has degraded practice, and opened the door for every form of inventive humbug. I have on several occasions taken out a pessary without the patient being aware that I had done so until her next visit to me.

I take the opportunity of quoting Duncan's advice: 'Think twice before beginning the often baneful practice of using any instrument, teaching a woman to depend on what, if not positively useful, is positively injurious, though perhaps not much. Many a woman has suffered from, and many a woman has died of, a pessary; but most pessaries, as I find them, are nearly innocuous for evil or for good.' Writing as far back as 1876, Gaillard Thomas, referring to the general use of pessaries, says: 'Were I asked at the present moment whether I believed that in the aggregate they accomplished more good or evil, I should be forced to give a doubtful reply.' He goes on to attribute the injurious consequences, not so much to the instruments themselves as to their mode of application. I do not think, since the above was written, the mischief has lessened.

I would add that the opinion of Matthews Duncan, here quoted, applies especially to cases of anteversion and anteflexion rather than to retroversion and retroflexion. I do not believe that any woman who suffers from marked retroversion of the womb can be a 'blooming and healthy' woman. And, further, I think it is our duty, as gynæcologists, to use every available and justifiable means to relieve her of an affection which in the great majority of cases is curable.

Goodell, in the paper before quoted, says:

'I have learned to unlearn that anteflexion and anteversion in themselves—that is to say, as displacements merely, and without narrowing of the uterine canal—are necessarily pathological conditions of the womb. The mistake made, as I have more elaborately shown in my "Lessons in Gynæcology," is in attributing to this natural position of the womb the various forms of pelvic trouble, especially that of irritability of the bladder, to which women are so liable. But the sympathy between the brain and the bladder is a remarkably close one—so close, indeed, that some physiologists contend that "every mental act is accompanied by a contraction of the bladder." A nervous bladder is, then, one of the earliest phenomena of a nervous brain, for nervousness means a deficient control of the higher nerve-centres above the lower ones—a lack of brain control. Now, a hysterical girl, or a woman whose nervous system has given way under the strain of domestic cares, consults the physician for such ordinary symptoms of nerve-exhaustion as wakefulness, utter weariness, a bearing-down feeling, backache, and perhaps, above all, an irritable bladder. Upon making a digital examination, he usually finds the fundus of the womb resting on the bladder, where it naturally should rest. At once he jumps to the conclusion that the whole trouble is due to pressure of the womb on the

bladder—viz., to the existing natural anteversion, or to the anteflexion, as the case may be. Enticed away by the vesical lapwing from the bottom factor—the shattered nerves—he now makes local applications, and racks his brains to adapt or devise some pessary capable of overcoming the supposed difficulty, heedless of the dilemma that the upward, or shoring, pressure of the pessary on the bladder must be greater than the counter, or downward, pressure of the womb, to which he attributes the vesical irritability.'

Many even of those pessaries still sold are useful for no purpose that I know of, save to be handed down through some museum to posterity as interesting relics of this 'pessary period.' Having thus briefly expressed my belief that the rash or indiscriminate use of pessaries is to be strongly condemned, I desire, on the other hand, not to be understood as undervaluing the assistance in treatment we obtain through the well-adjusted pessary. 'Notwithstanding all this,' said Marion Sims, 'I advocate and daily use pessaries in one form or other; because, if I did not, I should turn away a multitude of cases without doing anything at all for their relief. We should always do without them if possible; but if it be impossible, then it is the part of wisdom to resort to such appliances as will best answer the indications of the individual case.* In all forms of displacement where its employment is clearly indicated, it generally gives material relief. I know few steps in surgery attended with such obvious and immediate benefit and comfort to a patient, as the restoration of a retroverted uterus to its normal position, and its support and retention by a well-fitting pessary. In the same manner, in varying degrees of descent of the uterus, which more or less accompany all versions and flexions, with a pessary suited to the case we immediately secure that sense of support, and prevent the bearing-down feeling and associated pain which are so distressing. Treatment can be continued while it is worn. By such local means and general treatment the uterus and its supports can be so restored to a healthy state as to obviate the necessity for any mechanical appliance. In graver degree of displacement proper mechanical support is, as a rule, an

* 'Uterine Surgery,' by Marion Sims, p. 264.

indispensable part of the treatment, and often the only part from which the patient will derive any benefit. I shall only here refer to the few pessaries I believe to be of any service in anteversion.

It has been remarked that the foregoing observations in the text on the *abuse* of pessaries are hardly in keeping with the figuring and description of several of these. It must, however, be remembered that this manual is largely used by students as a text-book, and that such a description is required for purposes of examination, as students are expected by different examiners to be familiar with the appearance and mode of application of a variety of supports. I have been most careful to point out the conditions under which pessaries are indicated, and those for which I have, individually, a preference. I have omitted several from this edition, as such supports are now practically obsolete.

There are some safe rules to observe in regard to the use of pessaries in general practice :

1. Always make a careful digital exploration of the vagina and uterus before application (the rectum and bladder being empty).

2. In anteversion and anteflexion, if there be uterine congestion, sensitiveness, stenosis, or enlargement, avoid the continuous use of a pessary until these conditions be removed; trust meantime to dilatation of the cervical canal, periodical reposition with the sound, and dorsal decubitus, with general treatment.

3. Do not introduce a pessary until thoroughly satisfied of reposition of the uterus.

4. *Whenever possible, mould and fashion, from a celluloid ring, pliable metal, or the soft rubber and wire Hodge, the pessary you require, and regulate its size and shape, or lever-power, according to the degree of version or flexion, the tightness of the vaginal roof, and the capacity and muscular tone of the vagina.*

5. Always teach the patient how to remove a pessary, if there should be any pain or discomfort from its use. In many instances it is equally easy to teach her how to reinsert it; but, as a rule, this should be done by the practitioner.

6. Let the patient be seen occasionally at first, so as to ensure comfort in the use of the appliance, to detect any acci-

dental displacement, and to watch for any vaginal irritation. Patients wearing pessaries should be kept under observation, and periodical cleansing of the vagina with a disinfecting solution prescribed. Strict attention must be paid to the bladder and rectum. (It is well in anteversion to encourage the patient to retain the urine.) Always, when possible, contrive or select a pessary that does not interfere with coitus.

I do not believe that any verbal description can teach the proper selection or the correct adjustment of a pessary. This must be learned in the hospital ward or in private practice—best of all, in the extern obstetric department of a hospital. In anteversion our object is to raise the fundus, and place

FIG. 139.—Galabin's Pessary.

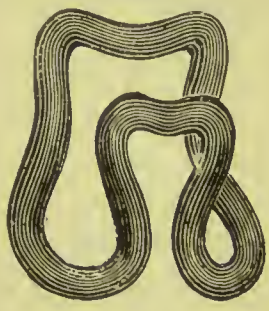


FIG. 140.—Blackbee s Pessary.

such a support anteriorly as will prevent it relapsing into its old position. In many cases of anteversion sufficient support for the uterus can be obtained from a Hodge, moulded to suit the case.* Celluloid rings of different sizes can be readily converted, by dipping them in very hot water, into any variety of lever support. We can rapidly shape from such rings a Hodge, with the arms of the lever of any length or shape we wish. When the ring has been so moulded, it is dipped for a few seconds in cold water to set. With these rings we are enabled to adapt, for the case before us at the time, a pessary of any size or shape we think applicable. Galabin's pessary is a most useful one in anteversion. It is made of vulcanite

* Many celluloid rings are useless, they are so soft and weak. Messrs. Arnold and Son have the best celluloid rings I know of, especially those with a central wire (p. 231).

(Fig. 139). The anterior limb of Hodge 'is replaced by a broad arch directed upwards, and nearly square at the summit.' 'In introducing the instrument, it is at first passed entirely within the vulva, with the upper limb in front of the cervix; the index-finger is then carried through it, and hooks the upper limb back over the cervix and into the posterior cul-de-sac.'

Figs. 141 and 142 show Grailly Hewitt's cradle-pessary, and its relation to the uterus when applied. We introduce it by pushing in the large ring of the pessary through the vulva, pressing it steadily in an oblique manner upwards and backwards; the summit of the instrument is then carried into position in front of the uterus, its lower end being pushed gently upwards.

The rubber pessary of Blackbee (Fig. 140) will be found easy of application. It can be adapted both for anteversion and retroversion.

I have given complete relief after reposition, by the employment of a Fowler's pessary of the proper size. Though this pessary is more applicable for retroversion, and personally I rarely employ it for anteversion, still, it will be found, in both forms of displacement, a safe, easily applied, and useful pessary by the general practitioner (Fig. 144).*

I adapt the remarks of Gaillard Thomas in speaking of Hurd's pessary to that of Fowler:

'It passes as readily into the vagina, when greased, as the cylindrical speculum does, and the cervix slipping into its canal, is held as if in splints, and thus bent backwards. There is no pessary with which I am acquainted that so well answers this function in all cases save those which belong to a most incurable class of anteflexions, namely, those *where the vagina joins the cervix*

* A caution is necessary in regard to this and any hollow vulcanite pessary. Should any small crack or opening be made in the instrument, it becomes foul and imprisons decomposing secretions. The principle of this pessary can be easily shown to the patient, and she may be taught how to remove and replace it. This is not possible with some women, and it should then be periodically removed by the surgeon and examined. The pessary as made by Messrs. Arnold is not open to this objection.

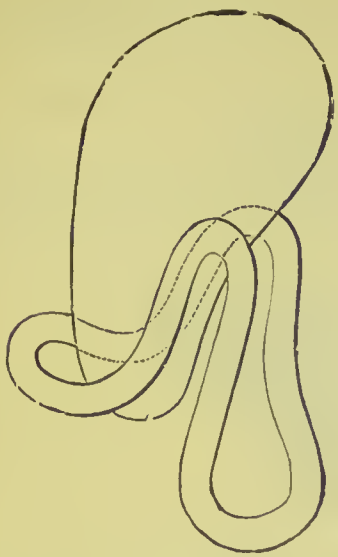


FIG. 141.—Hewitt's Cradle applied.

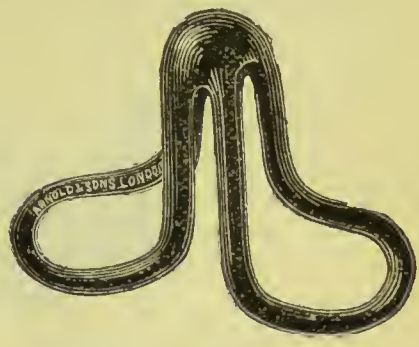


FIG. 142.—Hewitt's Pessary.

FIG. 143.—Gehrung's Pessary.

'Place the pessary (Fig. 143) on a table, the superior convex arch S below, the inferior concave I above, the curves R and L pointing towards you. Then take hold of the curve L, now pointing to your right, with the right hand, and insert curve R into the vagina to the right of the patient, until three-fourths of the instrument are buried within. Now make it turn on point R as on a pivot, by pushing up curve L towards the fourchette and the left side of the patient; so that, at the same time that curve L slips into the vagina, the arch S will turn upward under the body of the womb, and the arch I downward towards the os pubis. This being accomplished, the womb will turn to the normal axis; if it should fail to do so, use the pessary as a repositor by pressing the arch I upwards.'

very near the os externum. In these the cervix cannot project into the canal, and hence the splint-like action of the instrument is not developed.'

A Fowler's pessary of such a size should be chosen as will not incommode the cervix or the vagina.

When the pessary is in position, the neck of the uterus is received into the cup of the support, *and the curved anterior*

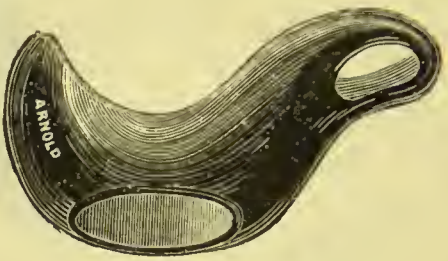


FIG. 144.—Fowler's Pessary.

portion, with the small opening for the finger to facilitate introduction and removal, lies in front of the uterus.

As I have long since abandoned the use of all external supports, I do not refer to the various appliances of this kind, figured in previous editions, devised by Cutter and Thomas.

Gehrung, of St. Louis, devised a special pessary, which will be found useful in both anteversion and anteflexion. Goodell speaks most favourably of it (p. 207).

ANTEFLEXION.

Anteflexion involves considerations distinct from anteversion. This form of displacement may be either congenital or acquired. The body of the uterus is bent forwards over the cervix, and the axis of the cavity of the fundus uteri no longer forms a continuous and slightly curved canal with that of the cervix, but is placed at an angle, varying in degree according to the extent of the flexion. The cervix may be flexed forwards at various angles (Gaillard Thomas), while the cavity of the fundus retains its normal axis; or the flexion may occur both in the body and neck of the uterus, an extreme degree of angular constriction at the isthmus uteri resulting.

As Goodell rightly remarks, the lesions anteversion and anteflexion blend into one another. There has been a state

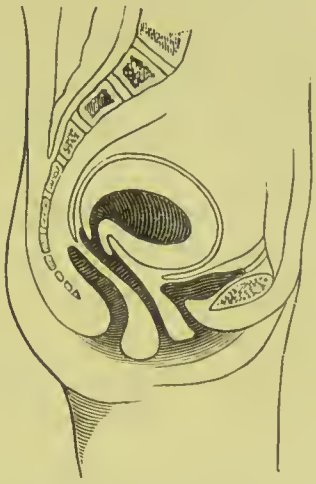


FIG. 145.—Anteflexion of Uterus (Schroeder).

of anteversion prior to the flexion. In primary anteflexion this displacement may not give much trouble until after marriage, when the increased stimulus to menstruation excites a more profuse menstrual discharge, and the obstruction to its flow caused by the flexion produces dysmenorrhœa. On the other hand, it may be accidentally discovered, and should always be remembered as a likely cause of severe dysmenorrhœa occurring with the earlier periods in young girls.

Gaillard Thomas describes cervical and cervico-corporeal flexions as those most frequently met with in nulliparous women, while the corporeal displacement is that seen in multipara. My experience would lead me to say that in practice we meet much more frequently with the corporeal than the cervical flexion. It is in cases of primary or congenital anteflexion that we find other abnormal uterine developments —short or conical cervix, short anterior lip, small uterine opening.

Causation.—An acquired anteflexion may be induced and promoted by almost any of the influences mentioned as tending to produce anteversion. I have already referred to the im-

portance of a free circulation at the 'axis of suspension' (Barnes) of the uterus. Any obstruction here must lead to venous congestion, congestion to interstitial hardening, 'hypergenesis of tissue' (Thomas), or hypertrophy, and, as a result, either morbid growths or secondary contractions are formed. In no situation should we more naturally expect these to occur than in the anterior wall of the uterine fundus. Increase of size demands larger arterial blood-supply, and, consequently, we have not alone greater habitual venous congestion, but the periodical determination of blood at the menstrual period adds to the general uterine derangement. Any further obstruction at this time to the free flow of blood still further increases the evil. The cycle of changes may commence either in morbid processes promoting congestion and weight in the uterine wall, or in an interruption to the circulation at the 'axis of suspension,' with consequent alteration of tissue at this part, and these conditions may be secondary to pathological extra-uterine states, such as tumours, adhesions, inflammatory effusions, a retro-hæmatocele, pressure from the rectum posteriorly, or from the abdominal viscera above. Or the initiatory mischief may be traced to ovarian, with consequent uterine, congestion, inflammatory effusion in the broad ligaments, adhesions of the Fallopian tubes, and occasional perimetric attacks.

Symptoms.—The symptoms depend to a great extent on the degree of flexion, the size of the body of the uterus, the accompanying stenosis, the pressure on the bladder; or such complications as metritis, endometritis, and perimetritis. Sterility being a common consequence of anteflexion, it is frequently present, with many of its attendant ills. In addition to the dysmenorrhœa, there is occasionally dyspareunia, an irritable and sensitive vulvar orifice and vagina, a sensitive and congested cervix, with pain on pressure in the posterior fornix of the vagina, caused by the swollen and sensitive ovary. The pressure on the bladder brings frequent desire to pass water, with difficulty of retention; there is constantly a sense of

weight and pain when the patient stands or walks for any time, and neuralgic pains occur in various parts.

Diagnosis.—This, as a rule, with the exercise of any care, is not difficult. A digital examination detects the solid body of the uterus lying anteriorly, and the angle of flexion marked by the presence of a sulcus, beneath which the cervix lies in the axis of the vagina, if it be not drawn out of position by any adhesions or cicatricial contractions. Care must be exercised, *if the flexed cervix be drawn anteriorly, not to mistake the displacement for a partial retroversion or retroflexion.* The uterus occasionally, in anteflexion, lies low in the vagina, the process of descent proceeding at the same time as the forward displacement.

Having so far detected the anteflexion, it is well to make a careful examination of the vaginal roof, search the anterior and posterior fornices for any contracting bands, or any perimetritic effusions, while we ascertain with the finger the degree of mobility of the uterus. Still retaining the finger in the vagina, we make a careful abdomino-vaginal examination, determining the size and mobility of the fundus uteri. If doubt still exist as to whether the tumour be an intramural fibroid, or some effusion which may have formed in front of the uterus, we must complete the examination with the uterine sound. This we may find some difficulty in passing. The sound may have to be withdrawn, and a new curve given it according to the degree of flexion, before we can succeed. When we have introduced it, we can satisfy ourselves of the exact shape, direction, sensitiveness, and degree of mobility of the uterus, and judge of the space between the finger and the sound by feeling the instrument through the uterine wall. At the same time that we determine the length of the uterine cavity, with the hand placed on the abdomen, we ascertain the degree of mobility of the suspected mass. Should we experience a difficulty in passing the sound, in a case of anteflexion, we may assist the introduction of it by pressing up the fundus with a finger in

the vagina, the handle being carried well back to the perinæum. If we succeed, the sound is brought steadily, but not forcibly or suddenly, forwards, and the fundus is raised. By such an examination as this, it is hardly conceivable that we can mistake the case of anteflexion for one of fibroid, or *vice versâ*, and overlook effusions, any old adhesions, or a vesical tumour or calculus.

Treatment.—Much of the difficulty experienced in practice in the treatment of anteflexed conditions of the uterus is due to the fact that the course pursued with encouraging success with one case completely fails with another. Cases occur in which we should expect troublesome symptoms to arise from the displacement, and yet there are none that we can reasonably attribute to it.

In fact, our conduct of the case by local interference will depend on—

(*a*) The discomfort caused by the flexion;

(*b*) The extent to which the uterus will support local measures, as the introduction of the sound, occasional reposition, the use of a stem;

(*c*) The presence of complications, as perimetritis, endometritis, uterine fibroids, adhesions.

Every case of anteflexion must be treated on its individual merits. When we find that local manipulation is ill borne, that any inflammatory conditions co-exist, and that we fail, after reasonable and judicious efforts, to restore the uterus to its proper position, it is better not to push our effort to the borderland of rashness, but simply, by careful attention to the bowels, by encouraging retention of urine and rest in the dorsal decubitus, by the application of the most comfortable vaginal support, and by periodical reposition by the finger, to make the patient's life as comfortable as it is possible. Otherwise the two indications for treatment are clear—the first, to restore the uterus to its normal shape and position; the second, to retain it by mechanical means in its proper place, while we correct the flexion and establish the patency of the uterine

canal. The first indication is effected by the uterine sound, aided by the finger in the manner already described; the second object we endeavour to accomplish by a suitable pessary, and, if necessary, by the use of an intra-uterine stem to straighten the canal. The general principle of relieving local congestion, and treating any inflammatory conditions of the endometrium, or the uterine appendages, before we trust to a mechanical support, is to be observed in the case of anteflexion. Proper dilatation of the canal with bougies, incision of the cervix, occasional depletion, the ordinary applications to

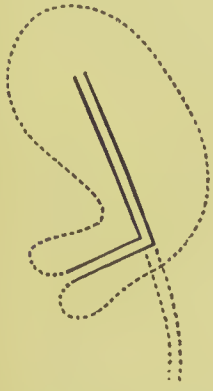


FIG. 146.—Sims' Operation for creating New Uterine Axis.

FIG. 147.—Bilateral division of the Cervix with Kuchenmeister's Scissors.*

the cavity of the uterus after dilatation, careful attention to the secretions, are steps that must frequently be taken, independently of the use of any pessary. In short, when a case of painful anteflexion presents itself, our duty will be to subdue any local inflammatory state, endeavour to replace the uterus, and apply a pessary.* If there be stenosis (with dysmenorrhœa and sterility), we dilate the canal, commencing with a small bougie, and gradually increasing. It is well to take the curve of the canal on the first occasion, and preserve an outline of this for future guidance in shaping the bougie;

Glycerine and ichthyol tampons have both sedative and depletive effects.

meantime we should, when it can safely be done, at periodical intervals of some days, gently retrovert the uterus with the sound, replacing the pessary while the uterus is thus retroverted. The step that frequently gives the most relief is section of the cervix uteri, more especially the posterior incision advised by Marion Sims.

For those not accustomed to uterine surgery, incision of the posterior uterine wall is the safest and simplest step, and Kuchenmeister's or Emmet's scissors is perhaps the most convenient instrument to use. The probe point of the scissors should be introduced for about three-quarters of an inch, and the cervix divided not quite up to the vaginal reflection.

If we incise the cervix and os internum with Sims' knife, which is the best instrument we can use, the operator having it directly under his control, we proceed as follows:

The patient is placed in Sims' position. The cervix is brought well into view, and is held securely by a tenaculum. The blade of Kuchenmeister's scissors is next introduced (the canal of the cervix may, if necessary, be dilated previously), and the posterior cervical wall is partially divided, as has been just described; Sims' knife is now taken and introduced through the internal os, and the posterior cervical wall is laid open. If any shoulder exists on the anterior wall, the knife should be directed to this, and it should be incised. Every precaution already insisted on when referring to division of the cervix for malformations and stenosis has to be taken. The operation should be performed a few days after a menstrual period. We must insist on the need for rest, and the greatest care until after the next menstrual epoch. The patient should be kept in bed for at least ten days. There is a certain percentage of risk in all such operations. Were all the untoward results published, we should not have 'cutting the cervix' spoken of so lightly and flippantly as it frequently is.

Plastic Operation of D. Vulliet for Obstinate Stenosis of the Cervix.

In those cases of stenosis of the cervix which are ordinary forms of treatment by dilatation or otherwise, Professor Vulliet performs the following operation (*Centralblatt für Gynäkologie*, January 20, 1894):

The coexistence of chronic cervical catarrh is a contra-indication. After most careful antiseptic precautions:

(1) The cervix and vaginal roof are drawn downwards and backwards, so that they stand well displayed at the level of the vulva.

(2) A crescentic incision divides the anterior vaginal wall at its insertion into the cervix. The anterior vaginal wall is then carefully dissected up, the separation being carried up the anterior uterine wall as high as the angle of flexion, so as to expose it. If the crescentic incision should not give sufficient room, a second incision perpendicular to it is made in the middle line of the vaginal roof. Then when the flaps are separated and carried to either side, a triangular wound results which offers abundant room. A sound is now passed into the bladder; if the base of the bladder be exposed in the wound, it must be pushed away and protected from injury.

(3) A long hollow sound is now passed into the uterus; the assistant who holds it turns the groove towards the operator, and carries the uterus forwards.

(4) The operator feels the instrument with his finger, and then introduces the point of the knife, and when he is sure that the point is in the groove of the sound, he prolongs the incision in the line to a point 1-2 mm. above the upper limit of the contraction. The knife is now removed and again introduced at the point in order to make a second horizontal, or rather spiral, incision, running round the left side of the cervix to end at the os externum at some point on the posterior aspect of the cervix, the length of this incision determining the length of the flap which is about to be raised. It is noteworthy how readily the flap can be cut in this way. When separated, the flap is seen to be triangular, and hanging from the right side of the cervix. Through this attachment the flap is nourished until it becomes united with the tissues in its new position.

(5) The apex of the flap is seized with forceps, carried to the point and fixed there with a stitch. One or two stitches on either side unite the flap with the walls of the incision.

It now only remains to close the wound in the cervix completely.

The T incision is to be preferred to the simple crescentic incision, because it gives freer access to the field of operation, and also permits of more satisfactory closure of the vaginal wound. The advantage is that it is easy to unite the point of the vaginal wound with that of the uterine wound. The ends of the suture introduced at the point are carried through the edges of the vaginal wound and then knotted. The ante-uterine cellular tissue is thus at once shut off. If the simple crescentic incision be employed, the upper uterine stitches are buried. It will be seen that a part of the flap is destined to remain vaginal; the upper part, on the other hand, which will lie above the vaginal insertion, buried in the parametrium, must have its mucous membrane

removed, or it cannot unite with the surrounding tissues; the mucous membrane of the lower part must not be removed. The mucous membrane should be removed immediately before the operator detaches the flap, otherwise the process will be tedious and difficult.—(Eden, *British Gynæcological Journal.*)

George Keith (*Brit. Gyn. Jour.*, 1896), with the view of obviating the tendency to closure of the cut surfaces after division of the uterus for anteflexion, and with the further object of straightening the canal, has urged the value of an operation devised by Dudley of Chicago. The following are the steps of the operation :

It is essential to use Sims' speculum, and as this operation may have to be performed on unmarried women, the smaller end of the smallest sized speculum, three-quarters of an inch in width, must be the one selected in such cases. It is thus unnecessary to rupture the hymen unless it be very small. The vagina is to be washed out, a tenaculum is to be fixed into the centre of the anterior lip of the cervix, and the uterus is drawn slightly downwards to strengthen the bend as far as possible. A sound is passed to determine the exact direction of the canal, which is then thoroughly dilated, preferably with a Goodell's dilator. This is followed by curetting, a large quantity of fungosities being usually removed. The operator then takes the tenaculum in the left hand,

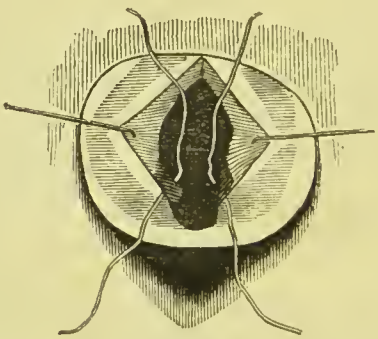


FIG. 148.—Dudley's Operation. Application of Sutures (Keith),

and with knee-bent scissors in the right cuts through the whole thickness of the posterior lip of the cervix almost to the vaginal mucous membrane. For convenience I propose to call the end of the cervix at the os the point, and the part where it meets the vagina the base. There are now two cut surfaces, the upper or right, and the lower or left, and each requires to be sutured separately. It will be seen that if the cut surface on one side is doubled on itself so that the point touches the base, and the same is done on the other side, the point, *i.e.*, the os, must be either drawn backwards or the base must be drawn forwards. What happens is that the point is drawn backwards. It is next fixed in this position by sutures. The stitches are put

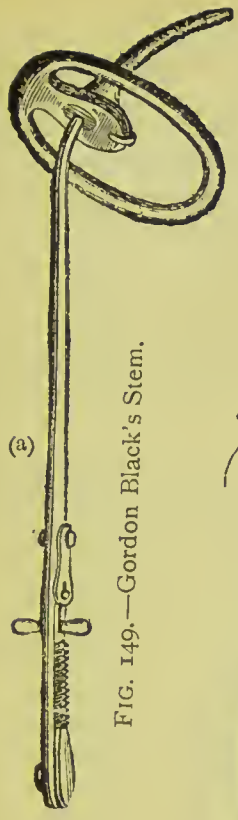


FIG. 149.—Gordon Black's Stem.

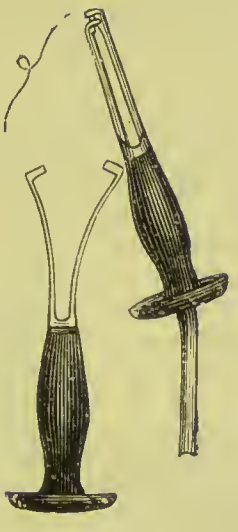


FIG. 150.—Bantock's Stem.

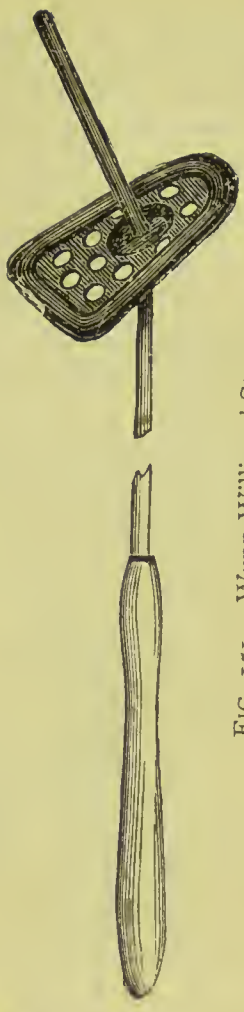


FIG. 151.—Wynn Williams' Stem.

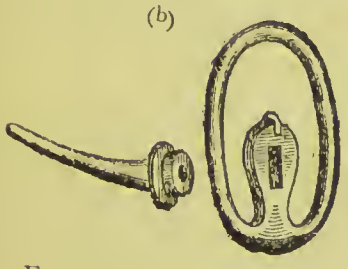


FIG. 152.—Stem detached.

FIG. 153.—Chambers' Stem.

FIG. 154.—Hewitt's Stem.

in in the following way: The needle is passed through the whole thickness of the point on one side and from the vaginal surface to the cervical, and in the reverse direction through the whole thickness of the base. The stitch is then tied, thus keeping the cut surface doubled on itself. A similar stitch is then put into the lower side, one stitch on each side being usually sufficient. In this way the incision, which was originally longitudinal, has become transverse, although in two halves.

To prove the necessity for taking proper antiseptic precautions, both before, during, and after such operations, I may briefly refer to the following case:

A patient was under my care in the Women and Children's Hospital; she had been suffering from dysmenorrhœa and antcflexion. I determined to perform Sims' operation, which, after due preparation, I did. She recovered without an untoward symptom. I was keeping the incision open preparatory to the use of a glass stem. She had arranged the day for her departure from hospital. Suddenly, on the twelfth day after the operation, pain and vomiting set in, apparently without any cause. I was sent for. She complained of slight sore throat, great uterine pain, and there was general distress. An attendant was taken suddenly ill in hospital on the same day, and two children were removed to an isolated room for a suspicious eruption that suddenly appeared. These children and the attendant developed scarlatina, and had to be removed. The origin of the attack was afterwards clearly traced to friends who had come from a house in which there was scarlatina, and who were visiting in the hospital. My patient suffered from all the symptoms of puerperal peritonitis, with septicæmia, and ultimately died. The case teaches its own lessons. The smallest detail in the after-treatment should not be neglected, and the patient must be protected from any accidental contact with septicæmic influences.

Intra-uterine Stems.—I have said little of intra-uterine stems in the treatment of anteflexion, for two sufficiently good reasons: 1st. The cases are very rare in which, with judicious management, they are required, and when the flexion is such that a stem is indicated, it will be found in practice that the chances are about equal between success and failure from its use. 2nd. The risks incurred during the time a stem is worn, and the constant supervision required from the medical attendant, added to the carelessness of patients, which cannot often be prevented, render the employment of an intra-uterine stem peculiarly hazardous in busy general practice. One may be inserted for a few days periodically while the patient is kept in bed or lying down; but even when used thus it should be

removed on the slightest sign of irritation. *Very rarely do I employ intra-uterine stems in my own practice.* I have a feeling of uneasiness during the time the stem is *in the uterus*, and always accompany its application with the strictest injunctions to the patient regarding rest and medical supervision. The precautions to be adopted when we determine to use an intra-uterine stem in anteflexion are these: (*a*) Never to place a stem in the uterus immediately before a menstrual period, and when one is worn, to remove it on the approach of a period. (*b*) Always to teach the patient how to remove the instrument by means of a string attached to the lower end of the stem, and to direct her to do so on the least indication of

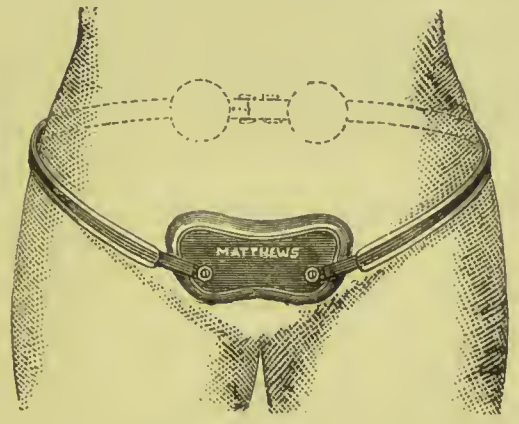


FIG. 155.—Uterine Support of Author.

This is a support (Matthews Bros.) consisting of two light springs and front and back pads; the front-supporting pad or pads are filled with air, the quantity of which is regulated by a little valve. The shape of the springs and general arrangement of the pads give a good upward and backward support, with a very soft resilient but firm air pressure. The support is very light and cool, and occupies little space, and is adjusted in a very few moments.

uneasiness, the occurrence of pain, any chilliness, or feeling of general malaise. (*c*) Never to place a stem in the uterus if there should be signs of past or present perimetritis during an inflammatory state of the endometrium. (*d*) When possible, to use a smooth, straight, or slightly curved stem, such as glass or celluloid (see author's stem, p. 117). (*e*) Never to use an

intra-uterine stem with external perinæal strap and support. (*f*) The stem should not reach the fundus of the uterus.

A diverging stem such as that of Bantock, which is gilt, can be introduced closed, as shown in the figure (Fig. 150). Thomas's stem pessary consists of a vulcanite stem supported in a cup fixed between the limbs of an anteflexion pessary. Grailly Hewitt's stem pessary for anteflexion is a combination of a Hodge's pessary with stem (Fig 154). Wynn Williams contrived a stem pessary which is as simple and safe as any other. The stem is supported on a modified Hodge, which is covered with a diaphragm of perforated india-rubber, in the centre of which is a cup to receive the bulb of the stem (Fig. 151). The stem is first introduced on a tent-introducer, and the Hodge is then guided to its position over the handle of the introducer, the bulb being received into the cup. The vulcanite stem is made of the same pattern as a Peaslee's galvanic stem. It has not such a tendency to slip out of the uterus as the smooth kind, and it can be applied with any modification of Hodge's or Smith's pessary.

The introducer is jammed in the stem-support by a simple movement, and fixed in it until by a backward slide of the blade it is released.

In Gordon Black's pessary the oval socket receives the stem, and prevents rotation of the latter. A gold bolt fixes the two portions of the appliance.

CHAPTER X.

UTERINE DISPLACEMENTS (continued).

RETROVERSION AND RETROFLEXION.

By retroversion we understand a displacement of the fundus uteri backwards, so that it lies towards, or on, the rectum, while the cervix uteri is directed forwards towards the pubes. This inclination occurs in varying degrees, from a slight backward version to an extreme displacement, in which the os uteri is thrown upwards and forwards, and the body of the womb downwards and backwards. I am not here referring to the retroversion of pregnancy.

Causation.—Everything that tends to relax the uterine supports, increase the size and weight of the uterus, weaken the uterine wall, soften and congest the tissues, diminish the natural pelvic support of the uterus inferiorly and posteriorly, or to draw the uterus backwards by adhesion, contributes to the production of retroversion. We thus find it frequently associated with pregnancy, laceration of the cervix, subinvolution, uterine fibroids, metritis and endometritis, rectocele, atonic or prolapsed vaginal wall, ruptured perinæum, adhesions, sedentary and standing occupations, neglect of the bladder. Retroversion is met with oftener in married women, and those who have borne children, than in the nulliparous. This we might anticipate from the occurrence of subinvolution, chronic hyperplasia, and laceration of the cervix and perinæum, as frequent consequences of labour. In women who have had several pregnancies and severe labours, we find these results complicated by atonic and relaxed, if not prolapsing, vaginal

walls. These likewise predispose to retroversion. In these days of tight-lacing and contracted waists, when a fashionable woman's estimate of an accoucheur's skill is measured by the tightness of a binder and the narrowness of her waist, retroversion is occasionally encouraged, if not produced, by unnecessarily tight squeezing and binding of the abdomen.

Symptoms.—These are the evidences of retroversion: pelvic discomfort, rectal and bladder pressure, distress in standing or walking, pain in the back and during defæcation. The gravity

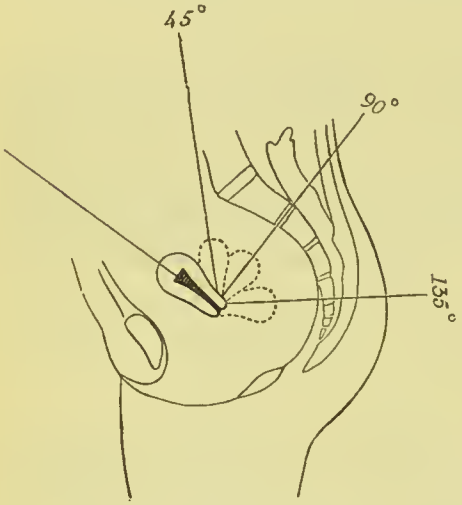


FIG. 156.—Degrees of Retroversion (Schroeder).

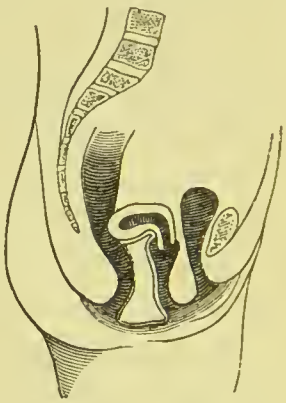


FIG. 157.—Retroflexion (from Schroeder).

of the symptoms arising from retroversion or retroflexion has no definite relationship to the extent or severity of the displacement. We find the symptoms aggravated in mild cases, and at times almost absent in those in which we would expect to find considerable distress. Should an acute retroversion occur, which is rare, the immediate consequences are generally very severe; great pain, tendency to collapse, inability to stand, are amongst the most prominent. When retroversion has existed for some time, symptoms arise which are the secondary consequences of the pathological changes induced by the continued pressure on the rectum and bladder: dysmenorrhœa, menorrhagia, sterility, cystitis, and rectitis. Should conception occur and the womb be retroverted, or should it be

displaced during the early weeks of pregnancy, it is not unusual for the patient to abort from the third to the fourth month, when the uterus enlarges and the irritation and distress increase.

Diagnosis.—By a digital examination we may detect the cervix uteri directed towards the symphysis pubis, and the round mass of the fundus resting on the rectum. These signs at once indicate retroversion. The extent of the fundal tumour, felt posteriorly, affords a rough measure of the degree of displacement. The combined method of examination, and the use of the uterine sound, will clear up any doubt. Before we pass the sound, we must remember that pregnancy and retroversion are not uncommonly coexistent. The uterine sound is not to be employed until we can satisfy ourselves that the woman is not pregnant. We have to beware of the error of mistaking a fibroid tumour in the posterior wall of the uterus, a hæmatocele, an effusion (either cellular or intra-peritoneal), for the retroverted or retroflexed uterus. The history of the case, the conjoined examination, the uterine sound, and reposition of the uterus, should prevent this error. Yet I have many times known concretions in the rectum, perimetric effusions, and more frequently interstitial fibroids, mistaken for retroversion.

Treatment.—Our first duty is to replace the uterus. In all first efforts to effect reposition, it is best, whether on a couch or in bed, to place the patient in the semi-prone position. If there be still difficulty, the woman should be put in the knee-pectoral position, her chest being brought well down on the couch, and advantage taken, at the moment of reposition, of a strong expiratory effort on the part of the patient. In some cases counter-pressure may be made in the dorsal position, between the hand on the abdomen, pressing down the cervix, and the fingers of the other hand, in the vagina, which elevate the fundus. In all these manipulations the bladder and rectum should be empty. Sometimes the retroverted uterus is congested, tender, and sensitive. In such a case it may be well to combine periodical reposition by the fingers, or an extra-uterine repositor, with occasional depletion, the use of the hot douche,

and the introduction of a glycerine plug at night, before we permanently replace the uterus and apply a pessary. But this necessity is rare, and the safe rule is, 'When it is practicable to do so without much force, restore the uterus to its normal position, and apply a pessary adapted to the size of the vagina and the cervical development of the uterus.'

The best repositor is the finger, and if it fail, the uterine sound (Fig. 158). The repositor of Bantock and that of Sims were ingenious instruments; but the sound is the safest, most effectual, and the simplest intra-uterine instrument for surgeons. To replace the uterus, we use the semi-prone or knee-elbow position; carrying the index and middle fingers of the left hand into the vagina, and resting these against the uterus, we press the fundus steadily forwards. Should this not rectify the displacement, we may place the index-finger of the right hand against the cervix anteriorly, and press it backwards towards the sacrum. We often succeed by alternating these efforts. The author's extra-uterine repositor will be found a most useful instrument (Fig. 159).*

For the knee-elbow position, the directions of Gaillard Thomas are useful: 'The operator, then lubricating the middle and index fingers of the right hand, introduces them to the fundus, he standing at the patient's back and facing her head, the palmar surface of the fingers being directed to the rectum. The body of the uterus is lifted upon the inner surface of the fingers until it becomes erect, then their dorsal surfaces, which will readily be the backs of the nails, are made to push therefrom over into the normal position.' To tamponade the posterior cul-de-sac with glycerine and ichthyol tampons, place the woman in the same position.

We may readily thus succeed in reducing by the fingers a retroverted uterus. This plan should always be tried before we use the sound as a repositor.

We can exert greater power with the fingers introduced into

* The ivory cup is so curved as to fit against the convexity of the uterine wall. The edges are well rounded. The silver shank is strong, but can be bent; it is given a perinæal curve. The aluminium handle is sufficiently large to hold on its serrated surface a large pad of wool. Either end can thus be used as a repositor, and admits at the same time of the tamponing of the posterior cul-de-sac. It is made by Messrs. Arnold.

the rectum, directing the pressure against the fundus, while the woman is in the knee-elbow posture. I have never seen any harm accrue from judicious attempts to replace the uterus with the sound. The modified outline diagram (Fig. 161) shows

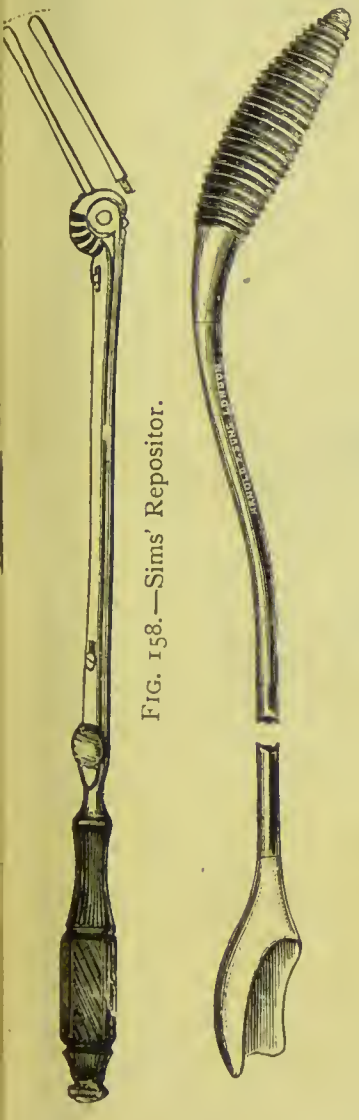


FIG. 158.—Sims' Repositor.

FIG. 159.—Author's Extra-Uterine Elevator and Repositor. *a*, Cupped ivory head ; *b*, Shank of silver ; *c*, Aluminium roughened handle, to hold cotton-wool, and form a soft pad (Arnold).

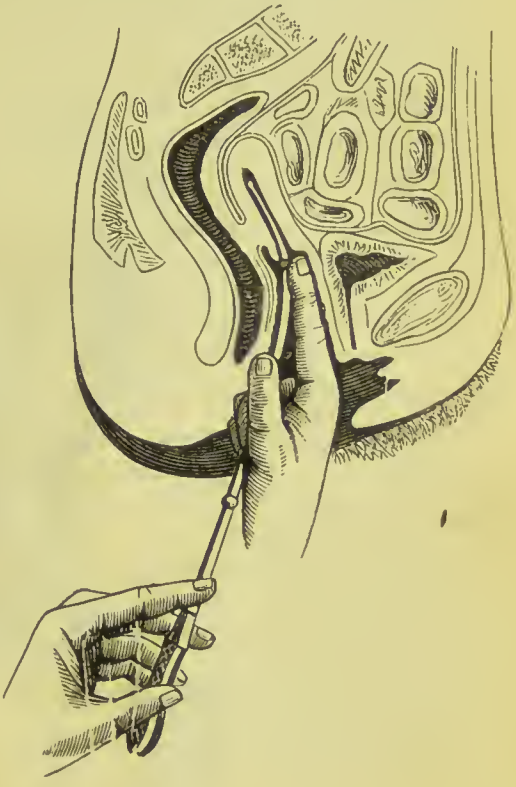


FIG. 160.—Introduction of Sound before rotation (Hart and Barbour).

This instrument (Fig. 160) can be used with advantage in the knee-elbow position to press the fundus forwards. The roughened handle retains a thick layer of cotton-wool, which can be used for the same purpose. The ivory cup, *pro* head, has smooth rounded edges. This is useful to keep the uterus forwards, while we tamponade the posterior *cul-de-sac*.

the method of rotating the sound, and the sweep given to the handle during reposition.

Having introduced the sound, the roughened face of the handle being directed backwards, the operator takes it lightly

in the left hand, and carries it, with a gentle sweep, upwards and forwards and to the right, while the handle is made to describe a semicircle, and the intra-uterine portion of the sound is thus gently rotated on its axis; finally the handle is carried well back to the perinæum. That the uterus may,

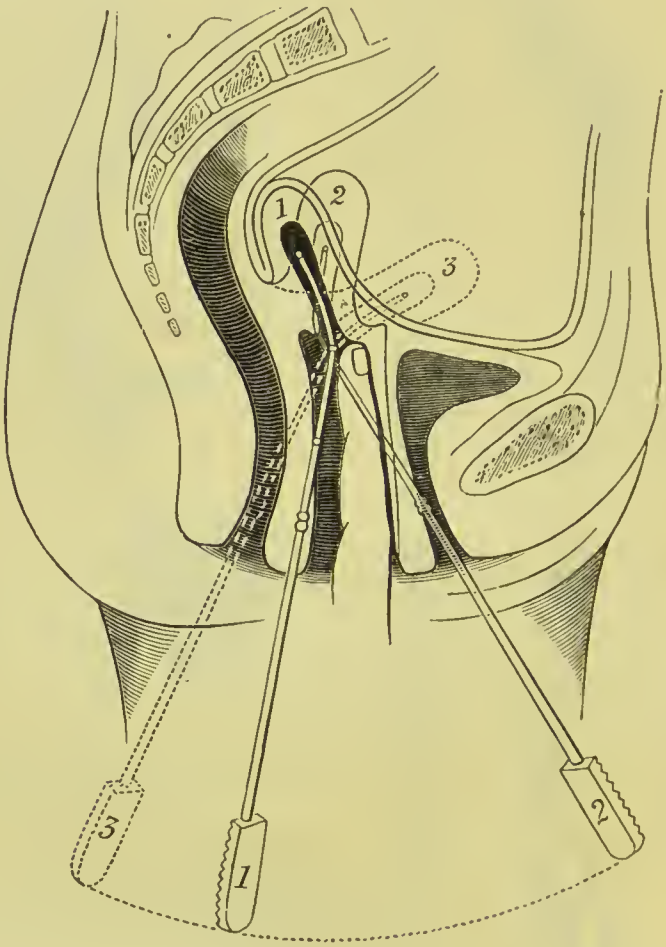


FIG. 161.—Rotation of Sound in Retroversion (adapted from Hart and Barbour).

through the presence of adhesions, resist all attempts at reposition, is not to be forgotten. To an experienced hand, the degree of resistance, both to finger and sound, indicative of such an impediment, is readily discernible, but this is not so in the case of the inexperienced, and therefore all the more care

LEEDS & WEST ... MEDICO-CHIRURGICAL SOCIETY

must be exercised by beginners in using the sound for the purpose of replacement.

When the os uteri is directed far forwards we may not be able to introduce the sound in this manner. The handle may have to be directed well anteriorly under the pubes, and, when introduced, the fundus must be first partially raised by pressing on the centre of the sound with the finger of the right hand, before the rotatory sweep is made with the left. *The sound is not to be introduced and simply rotated on its axis.*

Should a flexion complicate the displacement, the sound must be curved according to the degree of flexion. We may not be able to straighten the uterus. The same caution must be exercised, and the same means adopted, as in the case of anteflexion. Any previous inflammatory condition has to be controlled. The uterus may be partially straightened by the uterine sound, and still more so by conjoined recto-vaginal manipulation, the index-finger of the right hand in the vagina pressing downwards and backwards the cervix, while the index-finger of the left in the rectum presses steadily upwards and forwards the fundus. The manœuvre is best effected in the knee-elbow position. (See 'Retroflexion.') *The sound requires, in its use, gentleness and patience.* The ill effects attributed to it are generally the consequences of ill-advised and unjustifiable force, or of its introduction at improper times.

In the treatment of retroversion, I wish emphatically to state my experience, that with judicious and patient manipulation of the uterus by the postural method, careful reposition by means of the sound, and contemporaneous adjustment of a suitable pessary, the necessity for heroic interference is as a rule obviated. I have notes of a number of cases, in some of which Alexander's operation was advised, now completely and permanently cured, some of these women, in whom this method of cure was followed, having become pregnant and borne children.

When we have succeeded in replacing the womb, our next object is to retain it in its normal position. In obstinate or

difficult cases there is no better pessary for retaining a replaced uterus in its position than that of Fowler, already described. When by manipulation we have reduced the uterus, a pessary of the proper size is selected and introduced. This should be worn constantly for some time. I have had more *permanent* satisfactory results with this pessary than with any other. After a few months it can be replaced by a suitable Hodge.

Larger sizes than those usually sold I have specially made for me by Arnold. They are required in old-standing cases of retroversion with vaginal prolapse. In those cases in which there is tenderness and sensitiveness, it is well to prepare the patient by the application, three times in a week, of an antiseptic tampon of salicylic or boric acid wool soaked in glycerine, which is pressed up into the posterior fornix of the vagina, so as to push forwards the fundus; while by a second tampon, applied below and in front of the cervix, this latter is pushed back; the superior plug is thus assisted in its action on the fundus. Both plugs are finally retained in position by a roll of antiseptic wool passed into the vagina. In a large number of cases, however—in fact, this is becoming more the daily habit with me of late years—I mould on the spot the pessary in size and shape that I deem most suitable, out of the celluloid rings (Figs. 167-171) I have at hand.

There can be no doubt that the pessary, the principle of which is capable of adaptation to most cases of retroversion, is the lever-pessary. I quote here Goodell's remarks in describing the lever action of this support; they should be read by anyone who applies a support to the uterus:

'As its name indicates, this pessary acts on the principle of a lever; but the mechanism of its action is twofold. By stretching the vagina upward and backward, it draws the cervix in the same direction. The womb then turns on its central point of ligamentous attachment as on a fixed pivot, and the fundus is consequently tilted forwards. The womb itself thus becomes a lever, of which its point of attachment to the bladder is the fulcrum. The power is applied to the cervix, and the fundus becomes the weight, or resistance. This action remedies retroversions, but not retroflexions, unless complicated with retroversion, as they usually are. The anterior vaginal wall, with the visceral pressure above it, now becomes the power applied to the lower limb, or "long arm," of the lever; the posterior vaginal wall is the fulcrum, or support; and the upper limb, or short arm, lying behind the cervix, directly pushes the weight or fundus uteri. This action tends to remedy both retroflexion and retroversion. For instance, during the act of inspiration the descending diaphragm crowds down the abdominal viscera upon the bladder, to which are attached the cervix uteri and the anterior wall of the vagina. These organs, therefore, descend.

As a result, the lower or fore end of the lever is necessarily pushed down by the descending anterior wall of the vagina, on which it rests, while its upper or hind end proportionately rises up and tilts forward the retroverted or the retroflexed fundus. In expiration, the reverse takes place. The pressure is, therefore, not a steady, but a gentle rocking one, which is the most efficient of all. This, also, is one least liable to inflict injury on the soft parts, because the points of pressure are varying ones. But to attain these ends the pessary must be mobile, *and never so long as to put the vagina on the stretch; otherwise it loses its distinctive character of a lever, and degenerates into an ordinary ring pessary. It should further impinge on the soft parts only, and take no bearings on the solid structure of the pelvis. . . .*'

Arnold makes a modified Smith-Hodge with a cushion posteriorly full of glycerine, and of the shape shown in Fig. 162. It is a most useful pessary in those cases in which there is a

FIG. 162.—Thomas's modified Smith-Hodge.

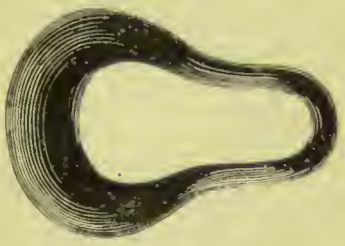


FIG. 163.—Arnold's Glycerine Pad.

sensitive fundus or ovary. Maw makes similar pessaries, the cushion being filled with air. I prefer the glycerine. Neither of these pessaries is very durable. They are apt to lose their shape.

To introduce a Hodge's pessary, bring the woman, on her back, or in the semi-prone position, over the edge of the couch or bed, with the knees well drawn up. The pessary is now taken in the right hand, while the labia are held lightly apart with the fingers of the left, at the same time that the perinæum is pressed in a downward direction. The pessary, with its uterine or longer end in a line with the vulvar orifice, is now passed into the vagina, the principal pressure being directed on the perinæum; when the support has completely passed the vulva, the fingers of the right, or conducting hand, are changed so as to turn the pessary half round on its long axis, thus bringing the concavity of the large curve to point forwards to the anterior vaginal wall. This is the moment of

greatest pain to the woman, and any bungling in rectifying the position of the pessary, as it lies pressing on the front of the cervix, causes still greater discomfort. The index-finger of the

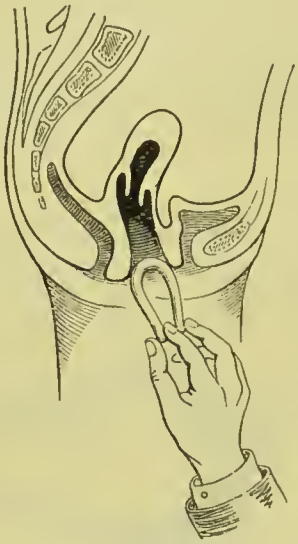


FIG. 164.—First step of introduction.

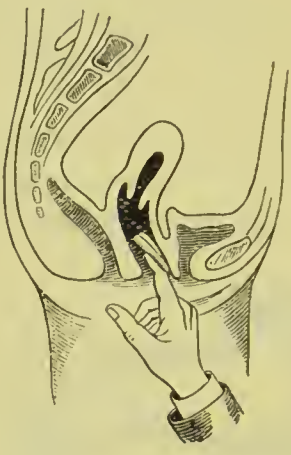


FIG. 165.—Second step of introduction.

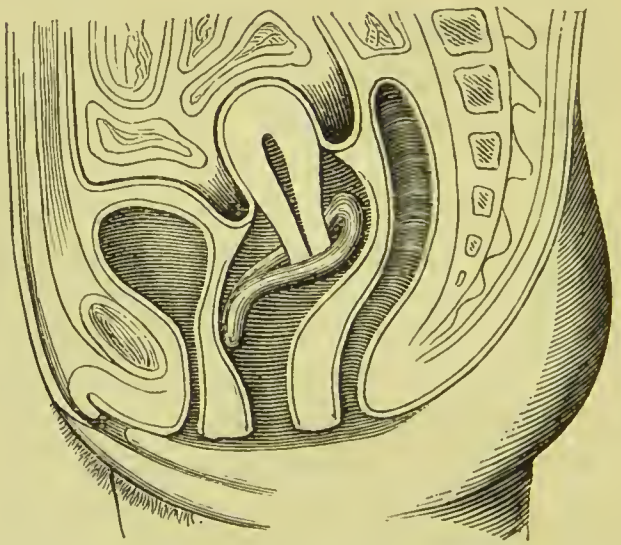


FIG. 166.—Smith-Hodge Pessary in position (after Goodell).

right hand is therefore quickly transferred to the upper bar, which is hooked or pressed down, so as to glide over the cervix into the vaginal cul-de-sac behind. The pessary is now

FIG. 167.—A Celluloid Ring.

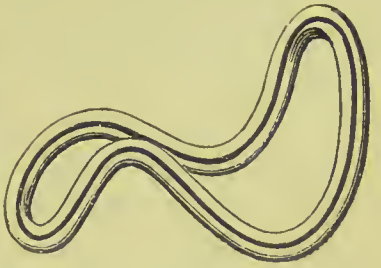


FIG. 168.—Same *finally* moulded for a case of Retroversion.

I cannot speak too strongly of the advantages of keeping ready at hand several sizes of these rings, as made for me by Messrs. Arnold. Having carefully examined the vaginal roof, and noted the size required, a few rings are taken and thrown into a basin of very hot water; when they are pliable, one is given the shape shown in Fig. 169. The ring is again thrown back into the water for a few seconds, and on being withdrawn it is given the form shown in Fig. 170.

FIG. 169.—First Shape.

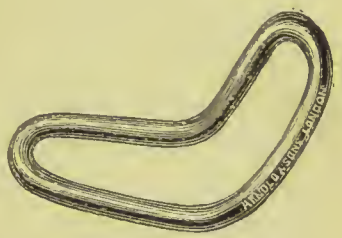


FIG. 170.—Second Shape.

It is again immersed, and after removal the second curve is made (Fig. 171). After a few seconds' final immersion, the pessary may be made to assume the exact shape desired, and the arms of the lever brought to the proper length and angle required (Fig. 168 shape advised). The pessary is next thrown into cold water, and left in it for a few minutes to set.

Fig. 171.—Third Shape.

carefully explored, its relation to the cervix ascertained, the degree of tension of the vaginal roof felt, and the exact position of the uterus determined, before we permit the patient to rise. Smith's pessary acts best when the lower bar presses on the soft and yielding anterior wall of the vagina, instead of on the pubic bones. It is well always to explain to the patient, or friend, the exact position of the pessary in the passage. If uneasiness should follow, we should instruct her how to remove it, by pulling, not too forcibly, on the lower bar, and by turning the instrument on its long axis and gently withdrawing

FIG. 172.—Watch Spring.

FIG. 173.—Metal Smith-Hodge.

it. If a case of retroversion should resist the application of a pessary, the one lesson every prudent practitioner has to learn is patience. By the daily practice of the knee-elbow posture. local measures directed to reduce congestion or inflammation, habitual reposition, and the education of the vagina and uterus to the presence of a well-fitting pessary, we ultimately conquer.

Schultze practises careful stretching, in the lithotomy position, of all adhesions which keep the uterus in its false position. This is done under an anæsthetic, the rectum and bladder having been thoroughly emptied. The rectum is irrigated with warm water. The index and middle finger of the left hand are passed into the rectum, and the thumb of the same hand into the vagina. The other hand is placed on the abdominal wall. Having determined the situation and nature of the adhesions, these are gradually stretched without any tearing, at the same time that the uterus is raised. I have learned from experience that much can be done by manipula-

tion to free recent adhesions. It has been my practice for some time, in those cases in which I found adhesions interfere with reposition, to place the woman in the knee-elbow posture, and both by rectum and vagina to manipulate the uterus for some days before trying reposition with the uterine sound.

Retroflexion.

In retroflexion the fundus is bent backwards on the cervix, and lies against the rectum. Retroflexion may be a congenital affection, due to arrest of development of the posterior uterine wall, and may remain undetected even after puberty. In practice, however, we have nearly always to treat that displacement which is secondary or acquired.

Causation.—We may refer to the causes of retroversion when we inquire into those which are productive of retroflexion. It is not difficult to understand how the uterus, yet softened and enlarged after pregnancy, with strained and relaxed ligaments, or with the perinæal support injured and weakened, may, while it is in a state of subinvolution, yield to abdominal or pelvic pressure, and bend at the axis of suspension. And in those cases in which there is an enlargement in the posterior wall, either as the consequence of congestion or hypertrophy, or an intramural fibroid, we can readily understand the occurrence of retroflexion. The flexion is, as a rule, preceded or attended by version. Contraction of the uterine canal leads to stenosis and obstruction to the menstrual flow, while the consequent congestion of the uterine tissues in the fundus, and the increase of weight, still further encourage the tendency to uterine prolapse and flexion. As in anteflexion, cause and effect react on each other; the longer the displacement lasts, the larger the uterine fundus becomes, and the more acute the angle of flexion.

Diagnosis.—In examining with the finger the retroflexed uterus, the os uteri is at once reached, occupying almost the vaginal axis, while the fundus is found as a solid mass, filling the

posterior cul-de-sac, and a well-defined sulcus separates the cervix from the fundus. The flexion is distinctly traceable with the finger. We confirm the diagnosis by both recto-vaginal and utero-vaginal examination. Carrying the index-finger of the left hand into the rectum, we feel the fundus through the rectal wall, and encroaching on it; with the finger of the right hand on the cervix, we can draw on the uterus, and so detect the mobility of the tumour and the conjoined movement of the cervix and fundus. It is only in those comparatively rare cases where the uterus is enlarged and fixed by adhesions or recent effusions that any doubt can exist after a careful vaginal and bimanual examination. To confirm our diagnosis, we pass the uterine sound, but in doing this we must exercise even greater caution than in retroversion. The difficulty will depend in a great measure on the degree of flexion. The sound must be well curved, corresponding to the curve of the uterine axis; the handle is taken lightly in the right hand, with the concavity of the instrument directed forwards. Guided by the finger of the left hand, the knob is introduced as far as the internal os; by a *tour de maître* the direction of the sound is reversed, the concavity being directed backwards, and the handle carried well forward towards the pubes. Assistance can at the same time be given to facilitate its passage into the uterus by raising the fundus with the finger of the left hand in the vagina. In those cases in which the os is directed far forwards and is high in the pelvis, the sound must be introduced with the concavity turned towards the sacrum.

Treatment.—All that has been said in regard to the management of retroversion applies with equal force to retroflexion. A suitable pessary has to be inserted when the uterus is replaced and the curve rectified. In the retroflexed womb, however, there is the flexion in addition to be corrected. The sound may have to be periodically passed, or a stem-pessary worn. If we determine to use an intra-uterine stem, we have to bear in mind all the precautions (p. 218) to be taken both before

introducing the pessary and during the time it is worn. The plan recommended by Schroeder is a safe one—to place the stem for the first few days in the retroverted uterus, and not to attempt replacement until it has been thus worn for a little time.

When we have replaced the uterus, we must endeavour to retain it in position by one of the forms of pessary recommended for retroversion — more especially Fowler's cradle pessary, or a Hodge suitably moulded. The question naturally

FIG. 174.—Glycerine Ring. No. I. (Actual size.)

arises, What is to be done to relieve the patient in those unfortunate cases in which rectification of the displacement is impossible, and the retroflexion incurable? All that we can hope to do is to palliate. Much relief may be obtained from the use of a soft rubber and glycerine ring to steady and fix the uterus, or a modification of Hodge's soft pessary moulded to suit the case.

We must insist on careful attention to the rectum and the frequent emptying of the bladder. Occasional depletion and the use of the warm douche are indicated if there be con-

gestion and uterine sensitiveness. Considerable relief may be given by sustained dilatation of the cervical canal and bilateral incisions of the cervix, especially if there be dysmenorrhœa.

Routh's Buckle Pessary.—The buckle pessary is an ebonite Hodge pessary

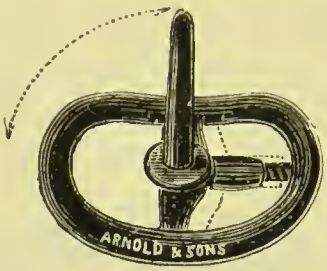


FIG. 175.—Routh's Pessary.

to which an intra-uterine stem is attached through the médium of a central diaphragm. There are three varieties:

First, a more common one for hospital use, where the diaphragm is of india-rubber, and capable of moving a little forward in a groove.

In the *second* variety the diaphragm is of ebonite, upon which the intra-uterine portion moves by a ball-and-socket joint. Over this intra-uterine portion a thicker covering can be adjusted, if it is desired to dilate the uterus more. The diaphragm may be moved more forward or backward, by altering the position of the screw by which it is attached to the Hodge portion.

In the *third* variety this motion, forward or backward, is effected by a screw of ebonite fastened to the diaphragm by one end, and to the inferior edge of the Hodge by the other, which can be turned at will by the finger.

VARIOUS OPERATIVE PROCEDURES FOR RAISING AND FIXING THE UTERUS IN CASES OF RETROVERSION AND RETROFLEXION.

Alexander's Operation.—Alexander, struck with the insufficiency of pessaries in many cases of prolapsus and retroversion, determined to try the effect of raising the uterus and fixing it by means of the round ligaments.

He rightly insists that the operation is one proposed to rectify displacement and maintain the uterus in a replaced position. It is not intended as a cure for all the antecedent or attendant, and many of the consequent, ills from which women suffer.

I give the stages of the operation as described by the originator of the operation himself:

'The patient should have her bowels and bladder emptied, and be put under chloroform or ether. The pubes are shaved on either side from the spine outwards. The pubic spine is felt with the fingers, and an incision made upwards and outwards from that point, from one to two inches in length, in the direction of the inguinal canal.

'The greater or less length of the incision depends on the amount of fat that covers the abdominal parietes. In thin subjects, and by experience in the operation, the length of the incision may be much lessened. By subsequent incisions the depth of the wound is increased until the tendon of the external oblique muscle is reached.

'The external abdominal ring is now to be looked for, and if not at once seen, will be easily found by searching for the oblique fibres crossing it, and for a small morsel of fatty tissue issuing from its inner end. In some cases the external ring is so well concealed that inexperienced operators have some difficulty in finding it. The pubic spine, the oblique fibres that cross the external abdominal ring, and the fatty protrusion at its inner end, are the landmarks that will readily guide the operator who has a fairly practical knowledge of the anatomy of that region. In the first incision a small artery (the superior external pudic) is sometimes cut across. It is the only vessel in danger. As a general rule the operation is bloodless.

'The oblique fibres crossing the external abdominal ring should next be cut across in the direction of the inguinal canal. A reddish tissue now bulges out, so characteristic in appearance as to be easily recognised, mixed with a greater or less quantity of fat. This is the end of the ligament, *as a ligament*, just before it spreads out in the mons veneris. An aneurism-needle is now passed under *all* this fatty mass, so as to raise it out of the canal and allow it to be grasped by the fingers (not by the forceps).

'We have now reached the most delicate part of the operation. The ligament should be gently pulled out, and all bands connecting it to the pillars of the external abdominal ring or to the neighbouring structures should be cut through. The accompanying nerve should also be cut across. In tearing the ligaments from their inguinal connections, some risk is run of breaking them or of tearing them away altogether, unless much care, patience, and judgment be exercised. As soon as these adhesions are overcome, no further trouble is experienced. The ligaments pull out with the greatest ease, and appear as white, strong, substantial cords.

'Having ascertained that both ligaments will run, the uterus should be placed in the desired position by the *sound*, and maintained in that position by an assistant, whose finger also touches the uterine cervix. The ligaments are now pulled out until they are felt to control the position of the uterus. The best rule, especially for beginners, is to pull out the ligaments as far as possible and then slacken them a little before stitching, to give them a little "play." This method favours union by the first intention.

'When the ligaments are pulled out to the required extent, they are held by an assistant while the operator fixes them to the pillars of the external ring and to the edges of the wound in the following manner:

'A curved needle threaded with fine silkworm gut or silk, or fine silver wire, is passed through the outer part of each pillar of the external abdominal ring and through the intervening ligament and tied loosely as a buried suture.

Another suture is passed in like manner internal to the first. These sutures should not be pulled so tight as to strangle the ligament. A small drainage-tube is passed into the canal for about a quarter of an inch to prevent any collection there, and so eliminate the only danger of the operation. It protrudes at the inner angle of the wound. The chafed parts of the slack of the ligaments may now be cut off, the bleeding ends ligatured, and the remainder stitched into the wound by means of the two sutures that are generally sufficient to bring the edges of the wound together. These stitches may be of silk, silkworm gut, catgut, or chromicized gut. I prefer the silkworm gut. I have tried catgut for the deep sutures, but have been disappointed with it. It gives way too soon, and was the cause of failure in two cases.

'In hospital I use the gauze-dressing and the spray during operation, but this is unnecessary even there, and the operation can be performed under any kind of *surgical* treatment, or with all varieties of surgical dressing.

'I now place a suitable Hodge pessary in the vagina and withdraw the sound. The patient's knees are flexed over a pillow, as after operation for hernia, and a morphia and atropine injection, if necessary, is given to relieve pain.

'The subsequent dressings depend on circumstances, and, as a general rule, the wounds heal by the first intention if strict antiseptic precautions are used and the ligaments not pulled so tight as that one is strained by the other. If the buried sutures give trouble and produce a sinus that does not readily heal, the sinus should be opened up and the irritating suture removed. When old-standing or acute retroflexion is treated by this operation, a substantial stem-pessary should be inserted as well as a Hodge, and maintained for about a month, or until the recoil of the straightened uterus has disappeared. I have generally employed galvanic stems, but now use ebony stems of the same size with a broad, ponderous bulb. These maintain their position admirably while the patient is recumbent, and they should always be removed at the end of the recumbent period.

'In extreme prolapse with large ulcerated uteri, the perinæal operation is neeessary in conjunction with the shortening of the round ligaments to ensure suceess. Alone, both operations generally end in failure.

'After operation some patients complain of pain in the back or along the eourse of the ligaments. This inconvenience is obviated by an ordinary well-fitting abdominal belt.'

Kocher, of Berne, modifies Alexander's operation by slitting up the anterior wall of the inguinal canal, so as to gain ample space to isolate the ligaments and obtain room for conducting the operation. He draws on the ligaments in the direction of the anterior superior iliac spine, stitching them on the aponeurosis of the external oblique muscles.

Parker Newman, of Chicago, carries an incision an inch and a half to two inches in length parallel with Poupart's ligament, midway between the spine of the pubes and the

anterior superior spinous process of the ileum, directly over the canal of Nuck. He thus exposes the glistening aponeurosis of the transversalis muscle. This he nicks, and passes a blunt hook into the canal, and with it pulls out quickly the round ligament and secures it. The same procedure is carried out on the opposite side. Both ligaments are drawn upon, and the reflection of peritoneum surrounding them is pushed back. This leaves a loop of ligament on either side about four inches in length, which is stitched together, and thus the ligaments are firmly fastened into the aponeurosis and walls of the canal by buried animal sutures. The patient is kept in bed for three weeks or more after the operation. He claims that by this plan we draw on the strongest portion of the ligament, that we anchor it more surely, guard against hernia, and in no way interfere with the external ring, while the operation is a comparatively rapid one.

Kellog, of Michigan, has shortened the round ligaments 400 times, without losing a single patient, and considers there is no risk save from the anæsthetic. He has had about 5 per cent. of failures. On the other hand, the operation has met with considerable opposition from various authors, on the ground of the incompleteness of the relief it affords, the risk of hernia, and the tendency to recurrence.

Coe has shown that a woman's dress and mode of life, active or sedentary, influence the size and strength of these structures, as in those of sedentary habits and given to fashionable constriction of the abdominal and pelvic viscera by tight-lacing they are weak and ill developed. The association of prolapse and anterior or posterior colpocele is regarded as an additional indication for the operation. Mundé advises the following modifications of the steps of Alexander's original operation :

Mundé's modification of Alexander's operation.

1. Accurate location of the pubic spine, which is reached by an oblique incision in the direction of the inguinal canal. Generally the protrusion of a little fat indicates the position of the terminal fibres of the ligaments. All bleeding is restrained.
2. Laying bare of the pillars of the ring, the whole mass of fat and tissue

lying in it being raised up and an aneurism-needle passed under it close to the bone. This is done with the handle of the scalpel.

3. Traction of the mass when loosened exposes the attachments and fibres of the ligaments.

G. Bouilly (*La Gynæcologie*, February, 1896), in an able paper on retroversion, emphasizes the opinion that, while not denying the success of various operative procedures, we may obtain the same result by more simple means. Abdominal hysterorraphy will probably alone survive, but it should be reserved for those complicated cases in which there is a lesion of the annexa. The operation is demanded rather by such lesion, or a perimetritic trouble, than by the simple displacement. The remedy is more often in the well-chosen and well-applied pessary. He divides into two classes sufferers from this displacement: those in which the vaginal perinæal floor is defective, and those in which it is perfect. In anteversion he retains the pessary for a longer period than in retroversion, that is, from eight to twelve months.

*Operation of Hysterorraphy.**—This operation has been performed by Kelly, Sänger, Lee, and others, for bad cases of retroversion and prolapse not amenable to Alexander's operation; for example, those cases complicated by adhesions. The steps of the operation as performed by Kelly are:

1. Cœliotomy—fairly free incision.
2. Suturing the round ligaments so as to bring them into view; this suture is carried through the peritoneal coat of the bladder, where the uterus rests, and thus maintains the natural position of the uterus to the bladder.
3. Suturing the round ligaments quite close to the uterus, to the tissues at either side of the incision in the abdominal wall.

This operation is a grave one to advise for such ailments as malposition or prolapse of the uterus. Its advocates state that the results are most encouraging, and the danger almost nil. But the difficulty soon will be to find an operation on the abdomen of a woman, or her pelvic viscera, the consequences of which can be said to be, in the common acceptation of the term, 'dangerous.'

* Howard Kelly abandons the use of the term 'hysterorraphy' for that of *suspension of the uterus*, a non-plastic operation as described in the text.

Howard Kelly's Method for Suspension of the Uterus (*Journal American Medical Association*, December 21, 1895).—Kelly lays down as the indications for suspension the existence of a retroflexion which cannot be corrected, and where the symptoms cannot be relieved by non-operative treatment; patients who have periodical relapses, never feeling quite well, or where there are menstrual symptoms and various general disturbances.

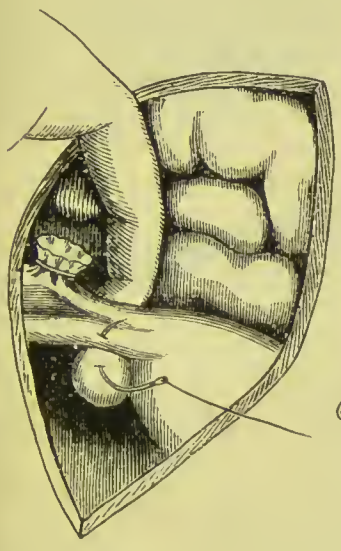


FIG. 176.—Passage of suspensory suture through round ligament in Hysterorraphy (Kelly).—*American Journal of Medical Science.*

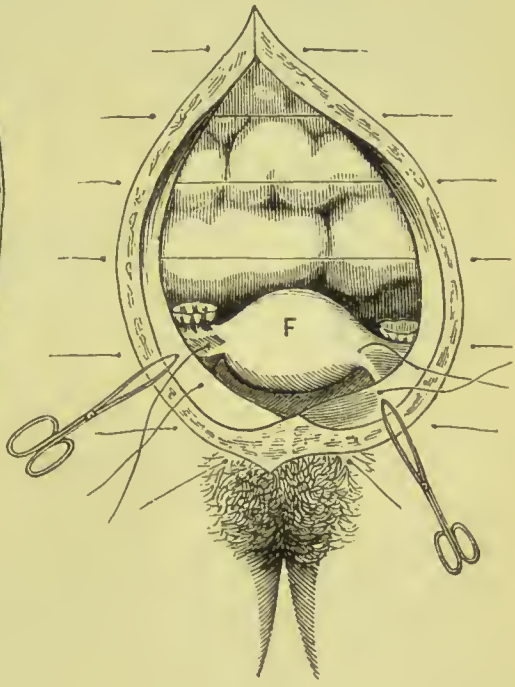


FIG. 177.—Suturing the round ligaments to the abdominal wall in Hysterorraphy. Artery forceps everting peritoneum (Kelly).—*Ibid.*

Further, he says: 'In a woman who is persistently neurasthenic, or in one who after repeated building-up efforts persistently falls back into a morbid nervous state, where there is a retroflexion or retroposition, with definite pelvic disturbances becoming more marked at the menstrual period, I would without hesitation urge suspension.'

He uses a uterine elevator of the kind shown in Fig. 178. He thus describes the steps of the operation:

'1. After due preparation, emptying the bladder, and anæsthesia, the abdomen is slightly elevated, and an incision 3 to 5 cm. long is made down into the abdominal cavity, beginning about 2 cm. above the symphysis.

'2. The peritoneum is then caught with artery forceps on each side, and drawn out. This is to prevent the pulling in of the peritoneum by the suspensory sutures and so leaving none to close the incision.

'3. The retroflexed uterus is then hooked up and lifted into anteflexion by means of two fingers carried into the wound.

'4. One side of the incision is then elevated with two fingers, and the peritoneum and subperitoneal fascia caught with a curved needle carrying the suspensory silk ligatures. The amount of tissue embraced is about one-third of an inch wide and one-eighth of an inch in depth.

'5. The same ligature is then conducted through the uterus on its posterior face below the fundus, and just above the first and piercing the posterior surface of the uterus just below the first; when this suture is tied, it increases the anteflexion.

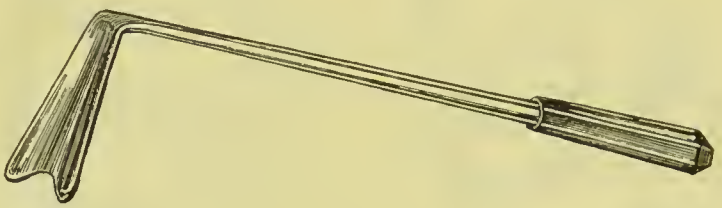


FIG. 178.—Elevator which serves to hold the uterus up while first stitch is being passed.

'6. The sides and front of the uterus are then examined to see that no intestine is caught, and the omentum is drawn down, and

'7. The abdomen is closed. I do this by taking off the forceps and sewing up first the peritoneum with the finest silk, and then drawing together the fascia with one or two silver-wire mattress sutures, finally closing the skin with a subcuticular suture of fine silk.

'The patient may rise sooner, but I find it better to keep her quiet from two to three weeks. It is not necessary to wear an abdominal bandage, and I never put in a pessary afterward.

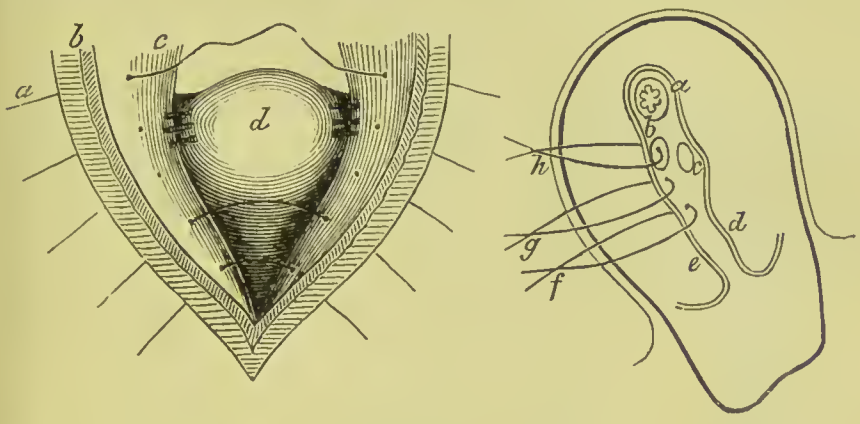
'The mortality in 200 cases has been zero, and there has not been a case of serious illness following the operation. There has been one recurrence of the retroposition, making the failures one-half of 1 per cent. In about 5 per cent. of the cases stitch-hole abscesses and separation of the lower angle of the incision occurred; this accident very rarely happens now, with my present technique in closing the abdominal incision.'

Should the tubes and ovaries be found diseased, he removes them, and any defect in the vaginal outlet he repairs at the same time.

I. *Operation of Indirect Fixation* (Kœberlé, Klotz).

The ovary and the Fallopian tube is first removed, and the pedicle is fixed to the abdominal wall. Klotz, who has operated in thirty-eight cases, attaches

much importance to the insertion of a glass tube behind the uterus into Douglas' pouch, which he withdraws after a few days. This operation has the drawback of sacrificing the ovary, of twisting the uterus, and of causing an imperfect reunion. He attributes several failures to it.



FIGS. 179 and 180.—Operation of Olshausen and Sänger, showing the position of the sutures and the scheme of application of same. (Taken from Bonnet and Petit.)

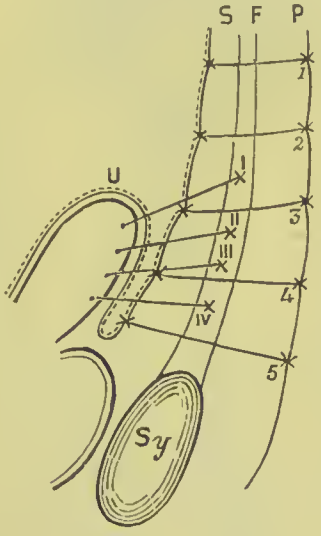


FIG. 181. — Terrier's Operation, sectional view, showing the insertion of the retaining sutures and those closing the abdominal wound. (Bonnet and Petit.)

II. *Operation of Direct Lateral Fixation of the Uterine Body* (Olshausen and Sänger).

The sutures are made at each side, not at the fundus, but on the borders of the uterus, by the aid of a 'crin de Florence.' Care must be taken not to

include in the sutures the anterior serous layer, nor to pierce the Fallopian tube nor the epigastric artery. This operation has the disadvantage of creating a fissure or buttonhole between the uterus and the abdominal wall, which may cause internal strangulation.

III. *Operation of Direct Mesial Fixation of the Uterine Body* (Leopold, Czerny, etc.).

Leopold fixes the fundus of the uterus to the abdominal wall. The uterus is replaced after the rupture of its adhesions. A strong needle filled with silk thread is passed from before backwards a short distance from the margin of the abdominal wound, and level with the fundus uteri. The uterine tissue is penetrated in the anterior portion of the uterine wall at the line joining the insertion of the round ligaments.

The needle passes under the serous membrane and the superficial bed of

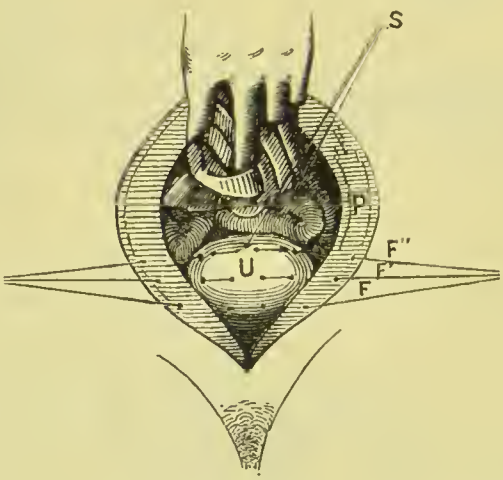


FIG. 182.—Terrier's Operation, showing the silk thread inserted into the fundus to draw the uterus forward and retain it during the operation. (From same.)

muscular tissue to an extent of 1 centimetre; it is then carried from behind forwards through the abdominal wall under the other margin of the wound. He places a second suture above the first, over the transverse line which marks the insertion of the tubes, and a third a little above the second, in the same manner. To render the adhesions more secure at this level, Leopold lightly scratches, with the back of a bistoury, the surface of the peritoneal covering of the uterus in the space which surrounds the stitches, so as to make a superficial and non-sanguineous abrasion which simply removes the epithelium. Then, when he reunites the lips of the abdominal wound at this level, he compresses and knots these three sutures over the abdominal wound, so that the anterior surface of the uterus is applied exactly to the parietal peritoneum. He then proceeds to close the rest of the wound. The sutures are taken out at the end of twelve or thirteen days. In abstaining from buried stitches, Leopold thinks that he

brings about firmer and tighter adhesions, less serrated, and less troublesome for the bladder.

It is well to adjust one of Hodge's pessaries for a month, to assist the stitches in maintaining the good position acquired.

Czerny pierces the anterior wall of the fundus with a strong needle armed

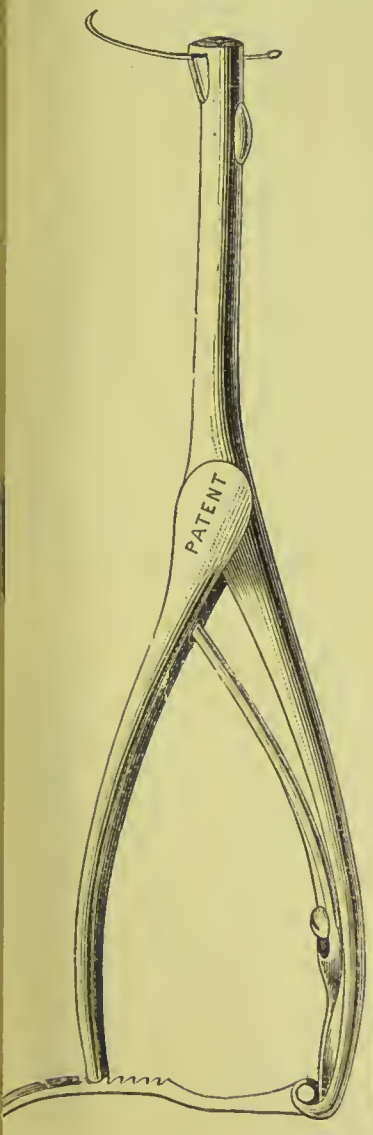


FIG. 183.

FIG. 184.

Useful Needle-holders (see also p. 268).

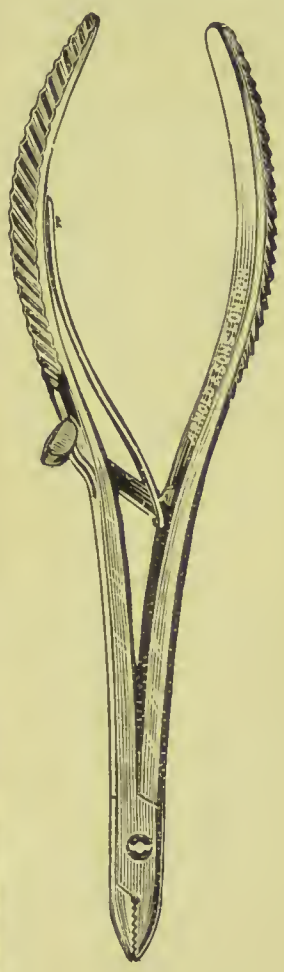


FIG. 185.—Charles Noble's Needle-holder. All the parts can be taken asunder for cleansing. Measurements of the instrument; Point to pivot of joint, $\frac{7}{8}$ in.; from pivot to joint of lock, $3\frac{3}{4}$ in.; from lock to end of handle, $3\frac{11}{16}$ in.; total length of needle-holder, $7\frac{15}{16}$ in.; width of handle at widest part, 2 in.; weight, $3\frac{1}{4}$ oz.

with sublimate gut. The needle first traverses the aponeurosis and the peritoneum on each side, but does not include the integuments. Two stitches are thus placed, care being taken not to make traction on the uterus. The ligatures are then tied, the ends cut, and the abdominal wall is sutured.

Terrier begins the operation by passing a thread of silk through the summit of the fundus of the uterus, by means of which it is drawn forwards with three gut sutures. The anterior wall of the uterus is fixed; the sutures pass through the entire thickness of the abdominal wall with the exceptions of the subcutaneous tissue and skin. Great care is taken in the way the sutures are passed through the uterine tissues, so that they are hidden by the anterior wall of the uterus and the abdominal parietes. Adhesion, he thinks, is thus better secured. A small drainage-tube is placed in the interior of the wound when it is closed.

Pozzi divides his operation into four stages:

1. Incision of the abdominal wall, in the middle line, for a distance of 8 centimetres.

2. The fundus of the uterus is brought forward by the index and middle fingers of the right hand, this proceeding being assisted by the introduction of the left forefinger into the vagina if required.

3. The fundus of the uterus is caught in the middle line by a forceps, and held forwards by an assistant. A Hagedorn's needle is armed with strong silk, and carried through the lower end of the wound, embracing in its passage the whole plane of the abdominal walls, with the exception of the skin and subcutaneous fat at either side; the same thread is brought in a spiral manner from below upwards, including in its course all the deeper layers of the abdominal wound, together with the superficial bed of the anterior wall of the uterus in the middle line, three turns of these spiral sutures being sufficient to fix the uterus.

4. The remainder of the wound is closed by two superimposed sutures of catgut, and the skin and cellular tissue are adapted by two silken threads.

Leith Napier's and Schacht's Operation.

A modification of Olshausen's and Sänger's operation has been carried out by these surgeons. It is not necessary to describe it in detail. Two fingers are introduced behind the fundus, adhesions, if present, separated, and the uterus is brought forward. The fundus is supported in position by a small sponge, and a temporary controlling suture passed tolerably deep through the uterine wall, which thus enables the uterus to be held. By means of two other sutures passed through the uterus, and taking in in their course the edge of the rectus sheath, peritoneum, and fascia at either side, the uterus is fixed in its new position. Should it be heavy, further sutures may have to be passed. The first, or temporary suspending suture, is finally passed through the deeper abdominal layers from within outwards, and the sutures are tied and buried externally to the rectus. Finally, the skin edges are exactly approximated, sterilized silk or silkworm-gut being used for the uterine sutures.

Sinclair of Manchester is a warm advocate for ventro-fixation, and in his hands no distress has been experienced when pregnancy follows the operation, and bladder troubles are quite the exception, while ventral hernia is an occasional consequence.

Vagino-fixation.

Strassman (*Brit. Gyn. Jour.*, November, 1895), in a paper before the Berlin Obstetrical and Gynæcological Society, argued that Alexander's operation caused few abortions, and that ventro-fixation seldom brought about a miscarriage; though, as in the cases of Olshausen and Gubaroff, and Strass-

man himself, delivery at full term may be influenced and impeded by the result of the operation. He points out that vagino-fixation, with laparotomy, causes solid scars between the vaginal wall and the uterus, which pull on the growing womb, favouring miscarriage. Dührssen saw miscarriages in 25 per cent. of the patients operated upon. Altogether, Strassman strongly condemns intra-peritoneal vagino-fixation. In many of Mackenrodt's cases of vagino-fixation, the patients complained of bladder troubles, and at times pyosalpinx resulted. If vagino-fixation be necessary, he operates by separating the bladder from the uterus and opening the abdominal cavity; the anterior flap of the peritoneum is stitched to the top of the uterus, and then the posterior surface of the bladder to the front of the uterus, thus closing the vesico-uterine pouch. [This operation would be better called vesico-fixation.—AUTHOR.] Olshausen approves of ventro-fixation rather than vagino-fixation. The general tendency in the discussion, including the views of Bokelmann, Flaischlen, Hossmann, Czempin, Winter and Ruge (who prefers Alexander's operation), was not favourable to vagino-fixation.

Extra-peritoneal Vagino-fixation (Muller's Operation).—Edge gives the following admirable description of this operation:* 'After preliminary curetting of the uterus, and application of 50 per cent. solution of carbolic acid, which should not be omitted on account of the frequent co-existence of endometritis with backward displacements of the uterus, and likewise because of the possibility of a suture entering the uterine cavity, and consequent danger of infection, the uterus is pushed into the position of anteflexion by means of Orthmann's instrument, and drawn strongly downwards. The anterior vaginal wall is then cut from the point of its insertion into the cervix up to the meatus urethræ, but not reaching the latter by 2 cm. If cystocele be present, a vertical oval of mucous membrane is marked out and at once removed.

'The author preferably carries this denudation close to the urethra, so as to remove the strong protrusion of the urethra so often left after labours, and which is, by its feeling of bearing down, the beginning of prolapse of the anterior vaginal wall.

'After this the bladder is separated from the vagina through the incision, and with the half of a knife from the cervix; the fingers may also aid in this. For this purpose also a solid catheter is passed into the bladder. The bladder is drawn away from its connections, and held up by a retractor, or fixed in its displaced position by a few temporary catgut

* *Brit. Gyn. Jour.*, August, 1896.

sutures. It is only by this thorough careful separation of the bladder in the first stage that injury of it by the sutures, or pressure upon it by the uterus, can be avoided, and, in case of pregnancy, this allows of uterine expansion without dragging the bladder up. If the uterus should not be large, and if it be movable, it protrudes from the incision after the bladder has been drawn up. It is then easy to reach the peritoneum on the anterior uterine wall, and its point of reflection upon the bladder. Half a dozen strong catgut sutures are next passed transversely in the anterior uterine wall, beginning at the wound above. The points of entrance and exit of the stitches are 2 cm. apart. Then these stitches are carried through the edges of the wound 1 cm. from the margins. The sutures are not tied yet, but the vaginal wound is closed with a continuous catgut suture from the urethra to the cervix. Orthmann's instrument is removed, and then the sutures are tied in the order of their insertion. The cervix is pushed upward and back as far as possible, and pressure applied from above on the fundus puts the uterus into an advanced position of anteversion, in which it is fixed by firm tamponade of the vagina with iodoform gauze. The bladder is freed. The patient is kept in for eight or ten days. The catheter is used if necessary; the gauze is removed, and astringent vaginal douches are given. Secondary treatment generally extends over eight or ten days. Usually the operation is easily performed without any trouble.'

The advantages of this operation are: It is performed in the vault of the vagina; it is less dangerous than others; convalescence is speedy.

Dangers of Vagino-fixation.

With regard to vagino-fixation, as originally proposed by Dührssen and Mackenrodt, further reports of various German authorities show that serious consequences have in many cases arisen in labour, causing either mutilation of the child or Porro's operation. Mackenrodt, recognising the danger of adhesions which cause anteflexion from Dührssen's method of fixing the uterus to the vagina outside the peritoneum, has lately performed, as we have already stated, vesico-fixation. In the operation itself there are the dangers of peritoneal hæmorrhage, perforation of the intestine or bladder, and last, though not least, sepsis. (See paper by Macan, *Brit. Gyn. Jour.*, August, 1896.)

CHAPTER XI.

UTERINE DISPLACEMENTS (continued).

PROLAPSUS.

By prolapse of the uterus we mean a descent of the uterus in the pelvis; this descent is attended by relaxation of the vaginal walls, prolapse, and frequently inversion of the vagina itself. The bladder is involved according to the degree of the prolapsus. If the uterus pass outside the vulva, we may have an accompanying cystocele or rectocele, both bladder and rectum being dragged on by the descending uterus and vagina. The prolapse is generally divided into three stages: in No. 1, the uterus lies entirely within the vulva; in No. 2, it make its appearance outside the vulva; in No. 3, it is protruded entirely outside the vulvar orifice. The two latter stages are also styled 'procidentia.' The influence exerted by the vagina and perinæum in supporting the uterus in the pelvis has been already referred to, as well as the part taken by the utero-sacral and other pelvic ligaments in the suspension of the uterus from above. Three pathological conditions we find associated with, and contributing to, prolapse: relaxation of the pelvic ligaments, atonicity of the vaginal walls, and weakened or absent perinæum. But further descent of the uterus necessarily means version. As the heavy uterus descends, the fundus yields to the abdominal pressure, and is directed or forced backwards, and thus a state of retroversion ensues.

The displacement, on the other hand, may commence with retroversion or anteversion of the uterus — commonly the

former; or the descent of the womb may be consequent upon a positively prolapsed condition of the vagina. It is rare to see a well-marked case of prolapse of the uterus in which there

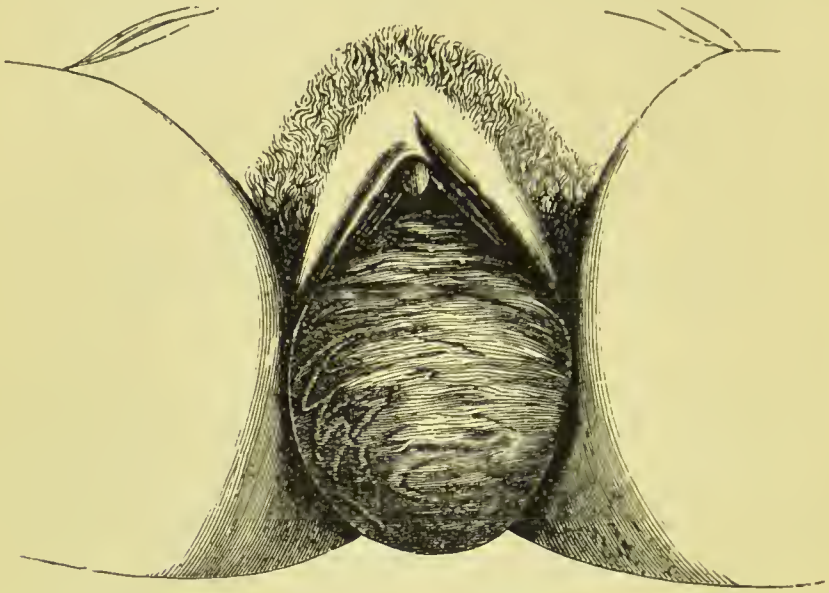


FIG. 186.—Prolapse complicated with Cystocele (Macnaughton-Jones).

This drawing, taken from a cadaver, was reported by me many years since, and an exactly similar condition of parts I have seen in a case sent to me recently. The conditions corresponded exactly to the section seen in Fig. 188, taken from Schroeder.

FIG. 187.—Showing gradual descent of Uterus (Thomas).

is not accompanying vaginal prolapse, which, in the great majority of instances, has, I believe, occurred synchronously with the uterine descent; the causes which operate in producing the one displacement at the same time tending to

induce the other. It is frequently difficult to say whether these causes have first taken effect on the vagina or uterus. The uterus descends in the vaginal axis, and gradual inversion of the vagina accompanies its downward progress. The entire organ becomes congested, and, as a consequence, there is hypertrophy both of the supra- and infra-vaginal portions. But this is generally greater in the infra-vaginal portion of

FIG. 188.—Prolapsus with Cystocele (after Schroeder).

FIG. 189.—Hypertrophic elongation of Cervix (Schroeder).

These drawings are placed side by side so that the two conditions, prolapsus and hypertrophy, may be compared.

the cervix, which is seen thickened and elongated. This hypertrophic condition of the cervix, both supra- and infra-vaginal, is an important factor amongst the causes producing complete prolapse.

If we thus take, in their sequence, the usual pathological events which operate during the occurrence and completion of the prolapsus or procidentia, they would be much as follows: (1) Relaxation of, or deficiency in, the uterine supports; (2) retroversion of the uterus; (3) descent of the uterus; (4) partial prolapse of the vagina; (5) incipient inversion of the vagina; (6) incomplete prolapse of the uterus, with descent of the bladder, and possibly of the rectum; (7) during the occurrence of the processes 4, 5, 6, enlargement of the uterus, with hypertrophy of the supra- and infra-vaginal portions of the cervix, and eversion of the lips of the os uteri; further inversion of the vagina, with protrusion of its anterior wall, and thickening of the mucous membrane, which gradually becomes hard and may be eroded in parts; (9) complete prolapse of the entire uterus and inverted vagina, both being altered by exposure and friction.

Causation.—The common predisposing causes are: Pregnancy; deficient or absent perinæum; laceration of the cervix; uterine tumours, abdominal tumours; uterine hyperplasia; imprudent clothing; advancing age; 'too roomy' pelvis; constant standing, and raising heavy weights; accident or shock; severe labour, in which instrumental delivery has been necessary. In women who have borne many children, especially in advancing years, we occasionally find all the pelvic supports weakened, the ligaments enlarged, the vagina having a tendency to prolapse, the perinæum deficient in vital tone, and the sphincter-vaginal muscles also enfeebled.*

Laceration of the cervix, as a consequence of labour, has as its usual attendants an enlarged uterus and a deficient perinæum. Both uterine tumours and uterine hyperplasia cause increase of weight of the uterus, and so tend to prolapse. Pressure directed on the uterus from above, either from some abdominal tumour,

* An interesting paper on 'A Case of Prolapse of the Cervical Zone of the Uterus, preceding Labour, at Full Term,' was read at the Royal Academy of Medicine, by H. W. Kidd, of the Coombe Hospital. In this paper he gives a complete *résumé* of the records of cases of prolapse of the *pregnant* uterus.—*Dublin Monthly Journal of Medical Science*, December, 1889.

or from the more common sources, tight clothing and heavy garments—pushes downwards the uterus and induces prolapse. Great exertion, necessitating fixation of the diaphragm and straining efforts of the abdominal muscles, when continued for a length of time in some laborious occupation, causes general weakness of the pelvic ligaments and a sinking of the uterus. This, with the secondary changes occurring in the uterus itself, is the cause of the descent.

During some violent efforts, as in epileptic convulsions, while straining at stool, or in a severe fit of coughing, the uterus may descend and be prolapsed. Such an accident is attended by great pain, symptoms of shock, and possibly those of internal hæmorrhage. As a rule, there has been some antecedent condition favouring the prolapse, as a too roomy pelvis; partial prolapse of the vagina; or a womb supported by an atonic vagina and perinæum, and rendered heavy by a polypus, fibroid tumour, or subinvolution.

It is well to remember that pregnancy has occurred in cases of prolapse, and so has tubal fœtation. As pointed out below, a submucous fibroid, an intra-uterine polypus, or diseased states of the annexa may be present.

Symptoms.—Pain is felt of a 'dragging' and 'bearing-down' nature—mostly in the back and loins, aggravated by standing or walking. The patient occasionally complains of a sensation as if 'something were coming down,' when at stool. In the earlier stages the symptoms of retroversion are present; later on, when the bladder and rectum participate in the displacement, vesical and rectal distress follow; such distress is felt in rectal irritation, tenesmus, sense of pressure, occasional difficulty in defæcation, ending, when there is complete prolapse, in cystocele or rectocele. The congestion which accompanies the prolapse is the cause often of menorrhagia or metrorrhagia. In extreme cases the epithelial surface of the procident mass—at first thickened and rough—may inflame and ulcerate, and these ulcerations may scale over and occasionally bleed. The irritation from the urine still further increases such ulcerations.

I have seen a large gangrenous slough on the surface of a procident uterus. This may be the result of strangulation of the mass at the vulvar opening.

Polypus complicating Prolapse.—A lady, over sixty, consulted me for complete prolapse of the womb and a foul discharge, which had continued for some time. On examination, I saw one of these foul ulcerations, in size about the circumference of a penny; and issuing from the hardened and everted os uteri was a most fetid and dirty-coloured discharge. I feared malignant disease of the uterus. I dilated the canal, and found, growing from the upper part of the elongated cervical portion, a small polypus, which I removed. The interior of the uterus I treated with nitric acid—this I repeated; to the external ulceration I also applied nitric acid, and subsequently chromic acid. Gradually this patch healed, and the discharge from the uterus became less offensive, and finally disappeared. The patient, before I saw her, had tried a variety of supports, and had given each up in turn from its inability to sustain the uterus. Ultimately I returned the prolapsed womb, and retained it comfortably in position with a vulcanite Zwanck's pessary, for which she was prepared by the previous use of oakum.

Diagnosis.—In the earlier stages of prolapsus the os uteri is lower than usual, and the body of the womb deeper in the pelvis. It may be that the uterus is anteflexed, or that there has been an antecedent retroversion. Even in this early stage we may detect a prolapsed state of the vagina and a flaccid condition of the anterior vaginal wall. If the uterus have descended for any distance, if it present at the vulva, or be outside of it, the least care will prevent any error of diagnosis. It is better to examine the patient standing, when we desire to estimate the degree to which the uterus has descended. It is well always to take the measurement of the uterine cavity with the sound. This is necessary, not alone to determine the position of the uterus, but also to differentiate true prolapse of the uterus from either prolapse complicated with hypertrophic elongation of the cervix, or the same distortion when it occurs alone.

In ordinary prolapse the sound may pass a little further than natural into the uterus, or the canal may be normal in length; while if there be hypertrophic elongation of the cervix, the sound passes a considerable distance, and we thus prove that the uterine cavity is enlarged, while by palpation we feel the

fundus in its proper position. If we pass the uterine sound into the prolapsed uterus, while in the state of procidentia, it may enter to the extent of some three or more inches. When the strain is removed from the relaxed tissues, on reposition, it will be found to pass to about the usual length. With any exercise of caution, no one can mistake a case of procidentia for polypus or inversion of the womb. (See 'Hypertrophic Elongation of Cervix.')

Treatment.—We may divide the treatment of prolapsus thus: (1) prophylactic; (2) replacement; (3) retention; (4)

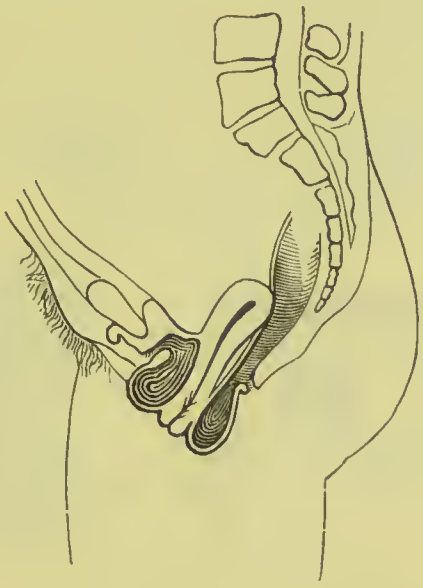


FIG. 190.—Ruptured Perinæum, Rectocele, and Cystocele, with Elongation of Cervix, simulating Prolapsus (after Martin).

operation. Under the first class we include those general constitutional and local measures which tend to reduce the size and weight of the uterus. With this object we enjoin such an amount of rest in bed, or on a couch, as the patient's circumstances will permit. Unfortunately, many cases of prolapse are met with in women who have to work for their living, and who cannot afford to lie down. In the earlier stages, when we recognise the displacement, there should be free use of the vaginal douche, with astringent washes, such as those of alum,

tannin, or sulphate of zinc, or tampons of salicylic acid wool and glycerine. The powder, being added to the tampon in various proportions, can be introduced by the patient at bed-time, and worn during the night. When the vagina is tamponed by the surgeon, the patient should be placed in the knee-elbow posture. Tight-lacing must be prohibited, and the under-garments suspended from the shoulders, and not from the hips. The patient may be made to wear a properly adjusted abdominal support or belt. This should fit accurately, raising and supporting the intestines above the pubes.

Any abdominal support should be fitted accurately on the patient by the maker, and be made to properly-taken measurements. Many belts are quite useless; they slip up on the waist and do not support the uterus. A silk-elastic support, especially made like a weft Nightingale cholera belt, is very comfortable, and will be found useful in many cases where our object is to keep the abdomen warm. They can also be had in Jaeger's flannel.

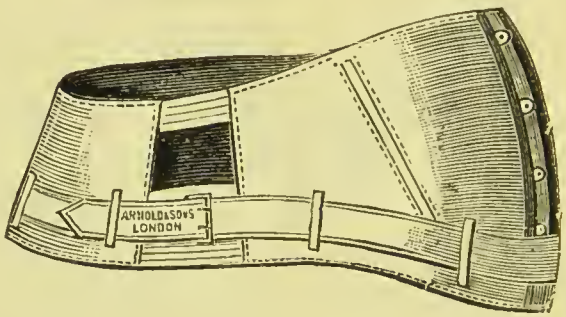


FIG. 191.—Duke's Abdominal Belt.

This belt fastens in front—corset fashion. (It may be prevented from slipping up by attaching a strap to the side of the belt, and securing this to a loop stitched to the top of the stocking.)

Regular cold bathing, and especially sea-bathing, when such can be had or borne, is of service. At the same time, any constitutional or local condition which either promotes congestion of the uterus or favours relaxation of its supports, must be attended to. Occasional depletion of the cervix; the administration (during the menopause especially) of such tonics as strychnine and the mineral acids, quinine and arsenic; careful attention to the bowels, so as to prevent all straining at

stool, by the occasional use of a cold-water enema or a saline water given in the morning, and the correction of any version or flexion of the womb, are some of the simplest and most efficacious measures we can adopt.

It is of special importance to attend to any chronic cough, and to allay laryngeal and lung irritation. If the prolapse should have lasted for some time, and the uterus be descending low in the vagina, or protruding from the vulva, we have to replace it.

To replace the procident mass, we get the patient into the knee-elbow position, and, grasping the base of the tumour, we follow the advice insisted on by McClintock in all such

FIG. 192.—Vulcanite Zwanck.

cases, and return that portion last which protruded first. The uterus can, if necessary, be prepared for the use of a pessary, and those means already detailed should be employed to contract the vaginâ and reduce uterine congestion.

To retain the uterus in position we have recourse to pessaries. We may classify the pessaries useful in prolapse under these heads:

(*a*) Those useful in incipient descent, complicated with retroversion or anteflexion.

(*b*) Those applicable in incomplete prolapse of the uterus, with partial prolapse of the vagina.

(*c*) Those suitable for complete prolapse of the uterus, with inversion of the vagina and loss of contractility of the vaginal walls.

For class (*a*) the best pessary we can employ is the ordinary Hodge. We may select any of the materials we prefer—vulcanite, celluloid, or wire with rubber covering. I prefer the celluloid, as it is the easiest moulded to the shape and size we require. We must adapt it according as the uterus is retroverted or anteflexed.

In class (*b*) Hodge's pessary will also be found to answer in

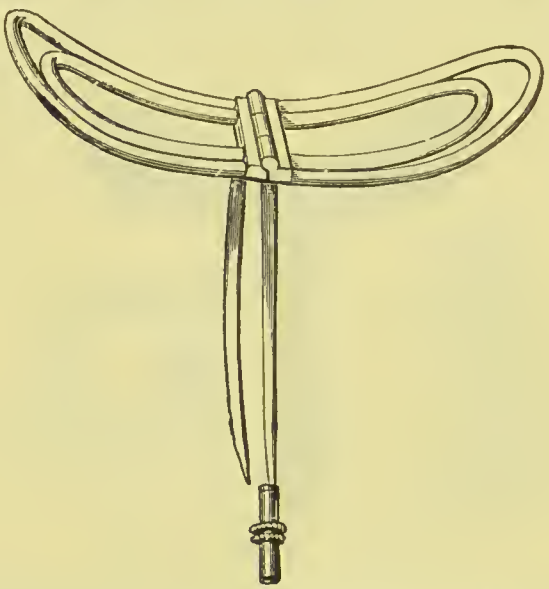


FIG. 193.—Godson's modification of Zwanck.

a large number of cases. Here the pessary should be well cupped, large enough to retain its position, but not of such a size as to forcibly distend the vagina. All pessaries should be periodically removed and cleansed, and during their use, vaginal deodorant and antiseptic injections should be occasionally employed. If a Hodge's pessary, or some modification of it, should not rectify the prolapse, we may try the 'watch-spring' (Fig. 172) or rubber glycerine ring (Fig. 174). The glycerine ring is by far the best soft ring pessary made. It has the disadvantage of requiring more frequent renewal. The

ring must be of a size suitable to the case, sufficiently thick, and with a strong spring. It had better be removed at night by the patient, and reinserted in the morning. In this degree

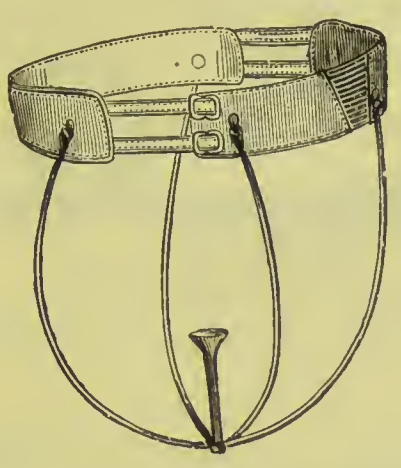


FIG. 194.—Napier's Prolapse Pessary.

of prolapse, also, we may have to use a Zwanck's pessary, of the vulcanite kind, or the modification of Clement Godson's.

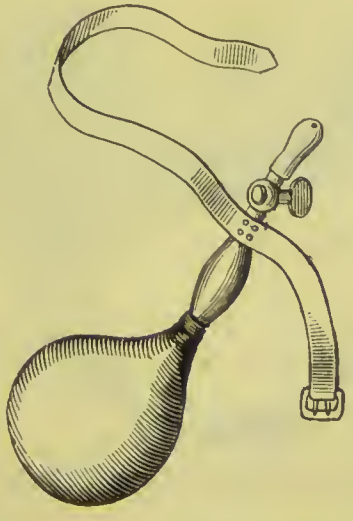


FIG. 195.—Braun's Colpeurynter.

I find that many patients manage the vulcanite Zwanck best, and prefer it to the wire. It has the disadvantage that it is apt to accumulate discharge, and thus become unpleasant; also the screw which regulates the divergence of the wings is liable to be broken in screwing or unscrewing it. The patient is usually taught to use the pessary, and how to insert or remove it. This latter she

should do *before* lying down at night, placing the pessary in a little Condy's solution. If Godson's kind be selected, it is equally easy of adjustment, and it certainly has the advantage in cleanliness and durability.

In complete prolapsus it will be found extremely difficult to sustain the uterus by any pessary. If we fail with a Green-

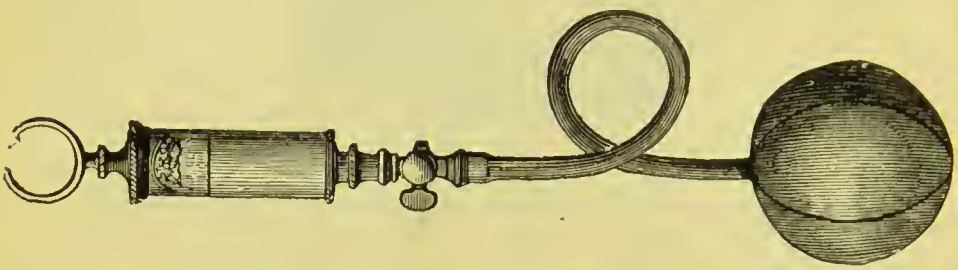


FIG. 196.—Inflating Pessary.

halgh, we may try Cutter's prolapsus pessary, or Barnes' cup and stem, made either in vulcanite or gutta-percha, retained with elastic bands. I do not find the ball inflating pessary of much service in prolapsus; yet it is the best of its kind. But I dislike the principle of all these balls and rings, and rarely

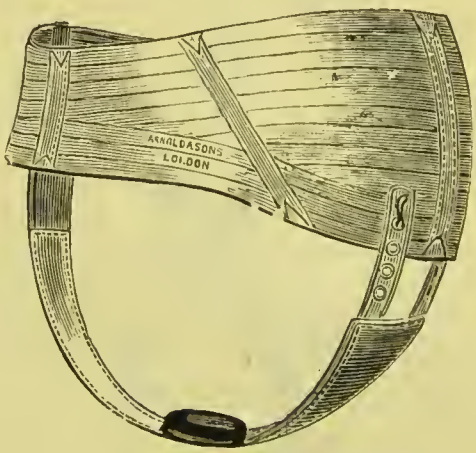


FIG. 197.—Palfrey's Perinæal Pad.

myself use them. In many cases, and in every variety of displacement, both material support and considerable comfort may be obtained from a carefully fitted abdominal support.

Much may be done in such cases by a proper perinæal pad; this can be maintained in its place on the perinæum by a suit-

able abdominal support and perinæal band, like that of Palfrey.

Surgical Procedures.—Various plastic operations are performed to remedy complete prolapsus. The steps of these operations are more completely described in all the larger works on gynæcology. We may thus classify them : 1. Those operations undertaken with the object of restoring and strengthening the perinæal body ; 2. Those intended to produce contraction of the vaginal canal ; 3. Partial closure of the vaginal opening ; 4. Amputation of the cervix.

FIG. 198.—Light Pelvic Strap for applying Perinæal Pad.

Perineorraphy.—'If we ever intend,' as Gaillard Thomas insists, 'to inculcate true, rational, and reliable precepts,' we must regard the perinæal body as the triangular concavo-convex body, with its apex superiorly, composed of strong elastic connective tissue, that fills in the space between the anterior wall of the rectum posteriorly, the vaginal wall anteriorly, and the summit of the vagina above. This elastic connecting pillar is itself under the influence of, and is supported on, a set of muscles, the tendency of whose action is to throw the perinæal pillar upwards and forwards, thus assisting in the support and

closure of the vaginal canal. Together with it these muscles (1) 'sustain the anterior wall of the rectum, and prevent a prolapse of the bowel, which, did it occur, would inevitably drag downwards the upper vaginal concavity, and with it the cervix uteri, and destroy the equilibrium of the uterus. (2) They support the posterior vaginal wall, and prevent a prolapse of this partition, which would favour rectocele. (3) Upon the posterior vaginal wall rests the anterior, and upon this the bladder, and against the bladder lies the uterus—all of which depend in great degree for support upon the entire perinæal

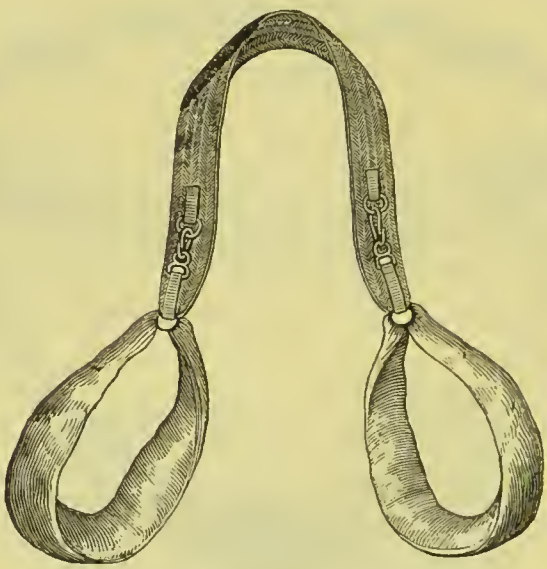


FIG. 199.—Howard Kelly's Leg Support.*

body. (4) They preserve a proper line of projection of the contents of the bladder and rectum, and thus prevent the occurrence of tenesmus, a frequent cause of pelvic displacements. Thus the entire perinæal structure may be truly said to form "the keystone of the arch" on which the uterus is supported in the pelvis.'†

* See Ott's Crutch, p. 45.

† I have here modified the teaching of Gaillard Thomas, in which I consider sufficient stress was not laid on the part played by the perinæal muscles in the pelvic floor.

Lacerated Perinæum.

We need, then, feel no surprise that, in consequence of laceration during parturition, or from atonic states due to prolonged pressure or constitutional debility, the perinæal body should no longer perform its part in the mechanism of the pelvic supports. Displacements of the uterus are amongst the consequences, and especially prolapsus. Assuredly if surgeons only recognised the ills, immediate and remote, which follow lacerated perinæum, we should less frequently hear of 'secondary operations.' The sensible obstetrician stitches the perinæum *at once* when he recognises the laceration after parturition. The futile plan of binding the knees together were better

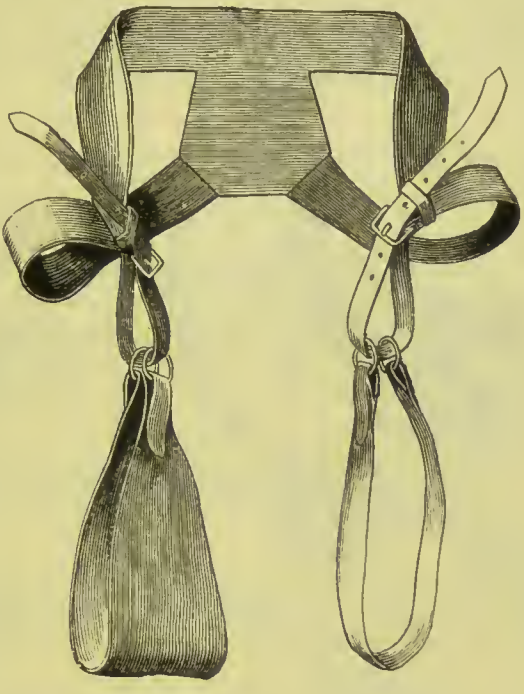


FIG. 200.—Dowd's Jacket and Leg Rest.

never conceived, unless, indeed, to be adopted after the immediate operation. It encourages procrastination, and is almost certain to end in failure.

Take it all in all, I believe that there is not, in the entire range of gynæcological practice, a point more necessary to insist on than early closure of the perinæal wound after parturition. This caution pertains rather to midwifery than to gynæcology; but it has such important bearing on the future happiness and comfort of a woman, when the labour has been long forgotten, that it warrants this stress being laid upon it.

Before and during all operative steps on the vagina and perinæum in colporraphy, fixation operations, and perineorraphy, the hands of the operator should be kept thoroughly disinfected, and the vagina, vulva, and perinæum should also be freely douched at intervals.

Whatever operation is performed (I believe that of Lawson Tait to be one of the most perfect in principle, and not difficult of execution), the objects are to denude the edges of the rent; to expose, posteriorly, two raw vaginal surfaces for union, so as to bring the rectum forward; to restore the power of the sphincter ani; and to create, when necessary, a new perinæal body. The steps vary according as the operation is intended merely to rectify a partial or a complete rupture. In the

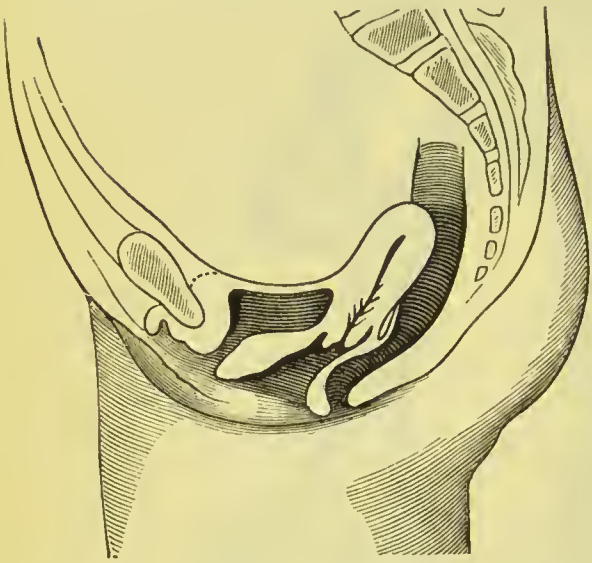


FIG. 201.—Absent Perinæum with retroversion (after Martin).

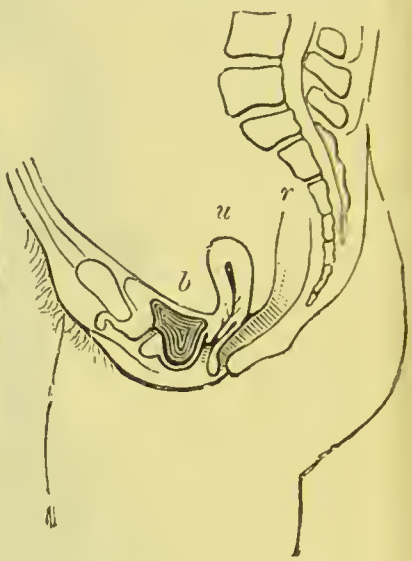


FIG. 202.—Ruptured Perinæum and Cystocele (after Martin).

former case, the operation is a comparatively trivial one, whereas in the latter we have not alone to construct a perinæal body and narrow the vagina, but also to re-establish the functions of the sphincter muscle.

Deferred Operation for Lacerated Perinæum.—As a minor gynæcological step, frequently required of a surgeon, it may be well to describe here the steps of the operation for complete or partial rupture of the perinæum, when the operation is deferred.

Appliances required.—A straight scalpel; a pair of curved scissors; artery forceps, dissecting forceps, some torsion forceps, a few bulldog forceps; perinæal needle, with the eye

in the point, rectangular or curved; a few short, well-curved needles, and needle-holder; silkworm gut; silver wire; a shot-compressor; some perforated shot; a self-retaining catheter; sponge-holders. Two assistants and an anæsthetizer are required, and a nurse.

The patient is placed on a convenient-sized table (Figs. 35,

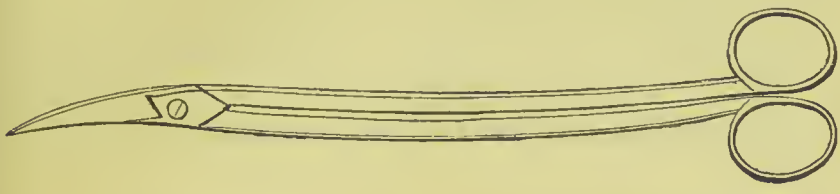
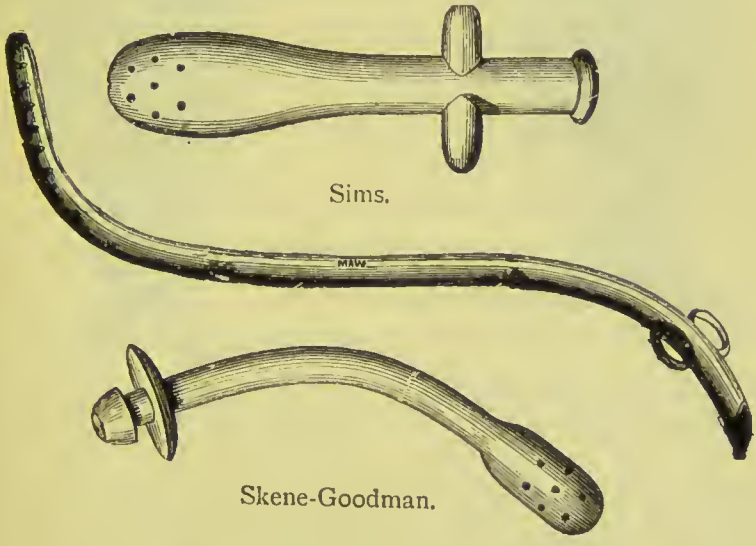


FIG. 203.—Scissors of Sims, curved on the flat.



FIGS. 204, 205.—Self-retaining Catheters.

36), opposite a good light, and is thoroughly anæsthetized. The head and shoulders are supported with pillows. She is brought well to the edge of the table, in the lithotomy position, and the knees are held apart by two assistants, one of whom controls the knee with his arm, while at the same time he stretches the labium of that side either with the free hand or with the hand of the same arm, which leaves the other at liberty to assist the operator.

As the operation may be tedious, the feet and legs of the

patient should be protected from the cold by stockings, and blankets wrapped round them. All being in readiness, the operator cuts off closely the hairs round the margin of the rent. He next introduces two fingers of the left hand into the rectum, and puts the mucous membrane on the stretch. I shall include here the steps required, presuming the rent to extend as far as the anus. The operation is commenced by paring off with knife, or scissors, or both, the rectal margin of the mucous membrane, and continuing the dissection by removal of a layer of the mucous lining of the posterior wall

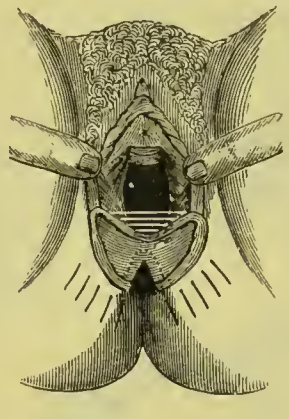


FIG. 206.—Denuded Surface, Anus involved (Goodell). No. 1.

FIG. 207.—Denuded Surface, Anus not involved (Goodell). No. 2.

of the vagina to the extent of an inch and a half. The lateral margins are now attacked in a similar manner, until a triangular raw surface at either side of the labium is exposed, of about one inch in breadth, and over an inch and a half in length. Bleeding is readily controlled by torsion and small bulldog forceps or serres-fines, assisted by the use of some very hot water. The raw surface at one side should be an exact counterpart of that on the other. The extent of the denudation, anteriorly and posteriorly, will depend on the extent of the laceration. He now prepares to pass the sutures. One sharply curved needle, such as that of Croft, or a properly curved short needle, held in a needle-holder, is passed, armed either with ovariotomy

silk, silver wire, or silkworm gut (I prefer wire), from the lower margin of the anus and half an inch to its outer margin, deeply upwards, across the recto-vaginal septum, well in front of and above the bowel-orifice, and is brought with a sweep of the needle down and out at a corresponding point at the opposite side. This is Emmet's suture. When passed, nothing should be seen of the wire save the two ends. It is represented in the figure by the dotted line. This suture is next secured by twisting. The perinæum is now closed by sutures entered at the points shown in Figs. 206, 207. The safest plan is to pass the first few sutures, unexposed, through the recto-vaginal septum. The last few passed will be partly exposed on the vaginal side of the rent. Each suture is secured by perforated shot. The wound is cleaned and sponged with carbolic solution; the thighs are brought together, the patient is placed on her back, and the urine is drawn off twice daily, or oftener if necessary. I much prefer to draw off the urine rather than trust to a retained catheter. Should it become clogged or slip out, though this can hardly happen with the Skene-Goodman or Sims instruments (Figs. 204, 205), the success of the operation may be endangered. The bowels may at first be locked with opium, and simple but nourishing food given. They need not be moved until the sixth or the seventh day. This is effected by an emollient enema, and, after they have acted, the rectal stitch may be removed. The patient must keep her bed for a fortnight, and it is well to have the knees bound together. I have had equally good results by the administration, every other day, of an olive-oil enema. In fact, it is the plan that I generally adopt. We get rid of the unpleasant complication of the locked bowel, and the risk attendant upon the passing of hard fæcal masses, with the consequent rectal irritation. Perfect cleanliness must be enforced after the operation, and the vagina should be carefully washed out each day with tepid permanganate of potash injection. It is well to keep a dry thymol pad over the wound, with a light perinæal bandage.

Operation for Closing the Vaginal Opening (*Episiorraphy*). —This may be done to the extent of completely closing the vaginal opening, leaving only a space for the passage of urine; or the orifice may be contracted, and yet sufficient room permitted for coitus.

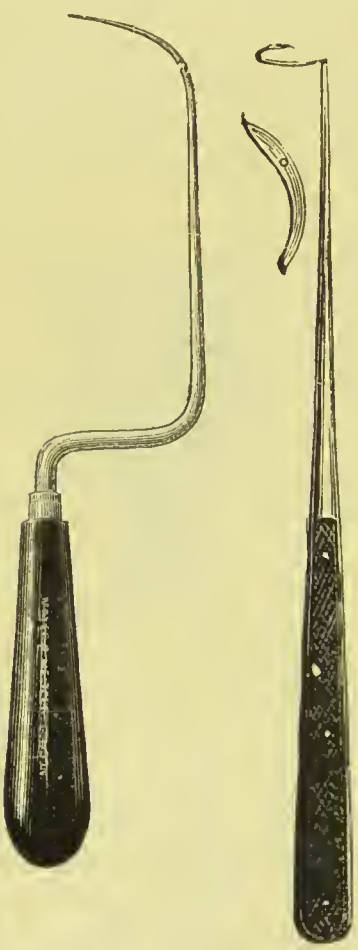


FIG. 208.—Perinæal Needles.

FIG. 209.—Needle-carrier.

FIG. 210.—Needle holder of Sims.

(*See also p.* 245.)

I have said that I prefer and invariably perform the operation of Lawson Tait. I am indebted to him for the following description of his method of making a perinæum. It will be found the simplest of execution in most cases, and thoroughly effectual.

In the *Dublin Medical Press and Circular* of May 9, 1889, is the description of a simple but efficient operation for lacerated perinæum, by Dr. Duke, of Dublin. For it he claims: simplicity, avoidance of sepsis, no loss of tissue. It is favourably reported on by More Madden.

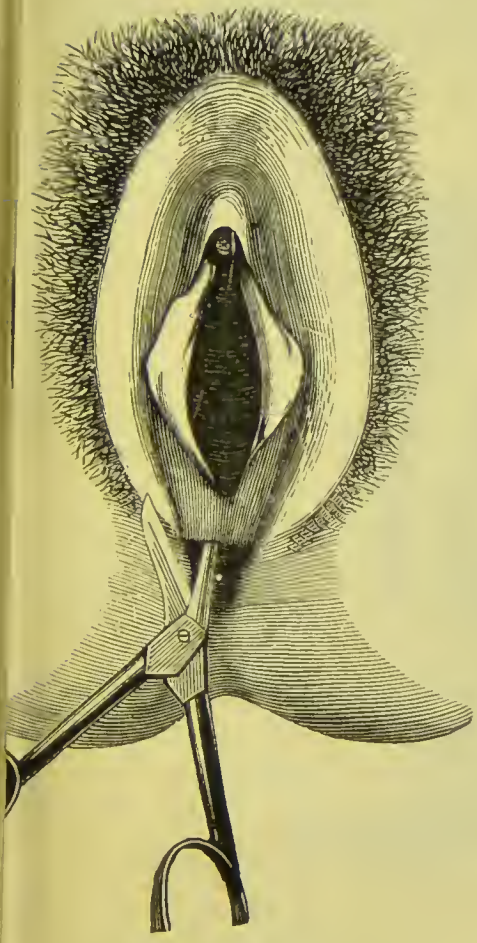


FIG. 211.—Splitting the Recto-Vaginal Septum.

FIG. 212.—Passage of the Suture.

These three drawings (Figs. 211, 212, 213) were made for Fancourt Barnes by Professor Vulliet, of Geneva.

TAIT'S OPERATIONS ON THE PERINÆUM.

'The operations are of two kinds. The first I term extension of the perinæum from behind forwards, and for this I make, by means of a sharp pair of pointed scissors, a horseshoe incision round the perinæum, the horns extending as far forwards as I judge to be necessary. It is made deeply into the substance of the labia on each side, and when its flaps are separated it makes a

V-shaped groove on each side. As many silkworm-gut sutures as seem necessary—generally three or four—are inserted by a handled needle, the needle entering well within the margin of the wound, so as to open out the V completely and evert its lips. The outer flaps of each V on the several sides are turned outwards, and the inner turned correspondingly inwards; and when the stitches are tightened they are in this way approximated as plane surfaces, and so they unite, making a very firm and thick platform for the displaced organs to rest upon, and this rarely gives way. I generally now leave the sutures in for three or four weeks.

'For torn perinæum the operation again is the same in principle, though

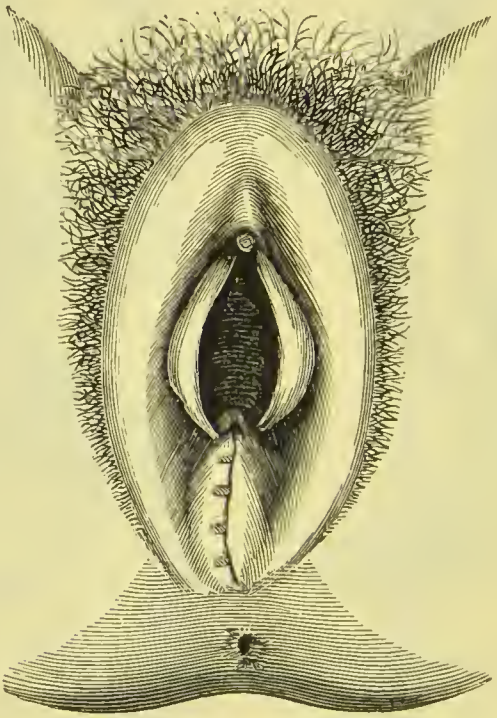


FIG. 213.—Wound closed.

different in detail. When the marginal folds of the buttocks are fully drawn asunder in such a case, the old tear is displayed by a thin white line of cicatrix extending transversely to the axis of the rent, which of course was at right angles to the plane of the perinæum. The healing of the tear has taken another direction altogether, and we have the cicatrix at right angles to the wound. This is, so far as I can think out the question or know the facts, wholly unique in its occurrence. It forms the basis of the principle of the operation which I perform, and that is absolutely the opposite of the principle of all denuding operations. *The scheme of my operation is to restore the old rent and unite it at right angles to its representative cicatrix, that is, at right angles to the plane of the perinæum.* In this way, and in this way only, can the perinæum be truly restored, and from this operation alone can it be hoped that the restora-

tion will stand the attacks of subsequent labours, as a large number of my restorations have done. I do not know of one having been torn a second time.

'Having the folds of the buttocks pulled firmly apart, so that the cicatrix is put on the stretch, I enter the point at its extreme end on one side, and, keeping strictly to its line, I run through to its other extremity. The incision is about three-eighths of an inch deep, and it forms two flaps, a rectal and a vaginal. From each end of the incision it is carried forward into the tissue of each labia for about an inch, and again backwards for about a third of an inch, making a wound like this—

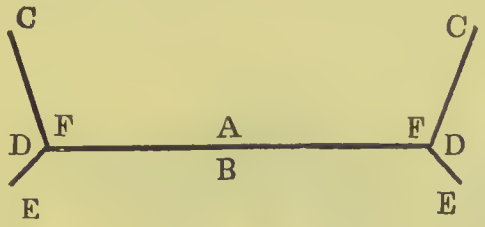


FIG. 214.—D to E, rectal incisions; F to C, vulvar incisions; D to D marks the line joining the vulvar and anal rents.

'The vaginal flap A is held upwards (the patient being on her back), and the rectal flap B being turned downwards, the angles A F C being pulled by forceps diagonally upwards and inwards towards the middle line, and the angles B D E being pulled downwards and inwards. The lines C E thus become straight, and the wound takes this form—

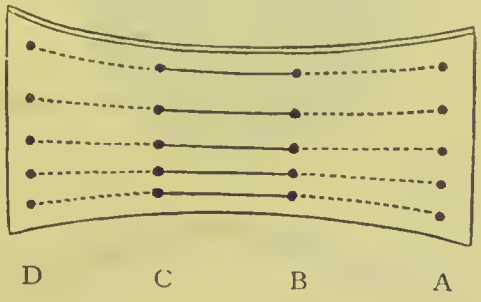


FIG. 215.

'By means of a stout-handled and well-curved needle the silkworm-gut sutures are entered on one side about an eighth of an inch within the margin of the wound (so as not to include the skin) at the dots A. They are buried deeply in the tissue as far as B, and then the needle is made to emerge so as to miss the angle of the wound. The needle again enters at the large dots C and emerges at the dots D. By thus missing the upper or deep angle of the wound between B and C, the two great and divided masses of the old perinæum, which lie in the parallelograms respectively bounded by the lines of large dots A—B and C—D, are accurately adapted. The rectal and vaginal flaps respectively point

into the rectum and vagina, and, like an old-fashioned flap-valve, prevent noxious material entering the wound. The resulting mass of perinæum is amazingly large ; union is almost inevitable, for I have failed only twice in many hundreds of cases, and then because there had been previous denuding operations. The resulting cicatrix is absolutely linear, and so resembles the natural raphe, that in three or four months after the operation it is quite impossible to determine, from the appearance of the parts, that the perinæum has ever been injured, for there are no stitch-hole marks left to tell the story. The pain experienced after the operation is trifling compared to the old method of quilled or shotted suture. *I leave the stitches in for three or four weeks, and take great care that the rectum and vagina are washed out twice daily'* (Lawson Tait)

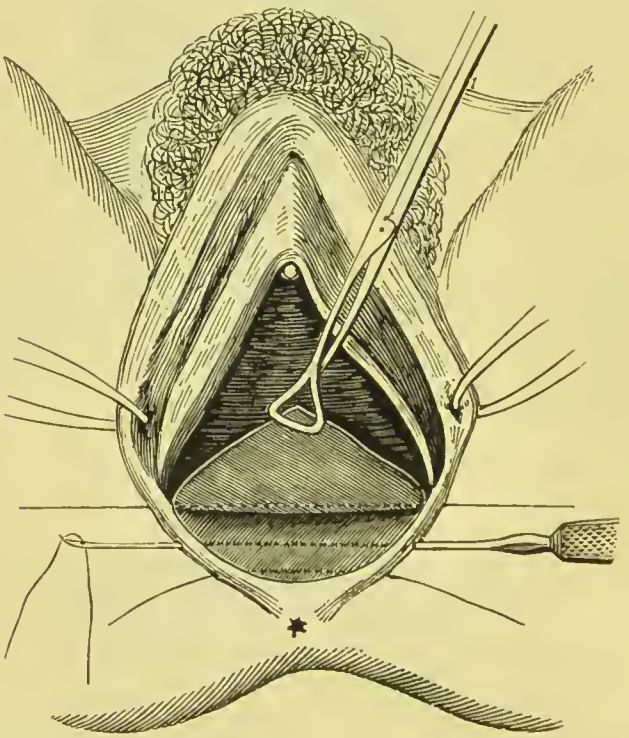


FIG. 216.—Doléris' Modification of Tait's Operation. Raising of the semilunar fold, and introduction of the sutures (Bonnet and Petit).

The vaginal flap is resected above the line of the suture shown in the drawing, and thus the closure of the vaginal denuded surface, and the remaining portion of the raised tongue of mucous membrane, is secured.

Doléris performs a further modification of Tait's operation, which he styles 'Colpoperinéoplastie par glissement.' The minute steps of this operation it is not necessary to describe here. The vaginal flap, having been raised and bared, is

brought at the middle point of its base to the centre of the cutaneous margin of the wound. The flap is then fixed in its new position by a series of sutures, three in number, carried from the cutaneous margin through the lower border of the vaginal flap from one side to the other, beginning in the centre. A final terminal purse-string suture of the nature before referred to is passed so as to secure complete and deep adaptation of the tissues.

In grave cases of prolapse Dührssen combines the three

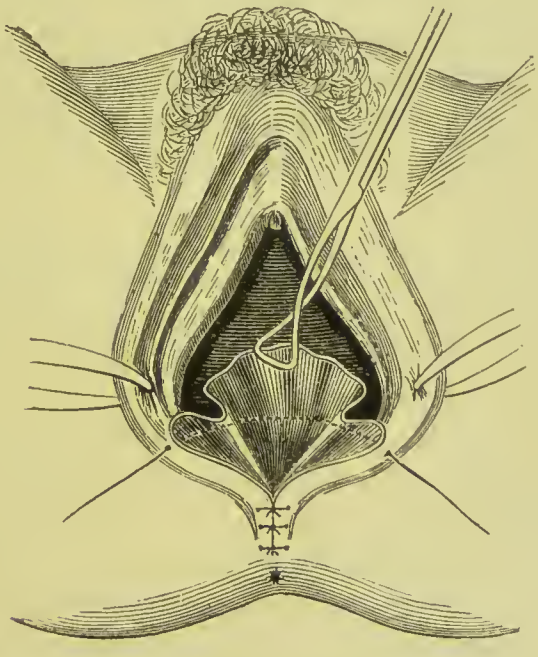


FIG. 217.—'Colpoperinéoplastie par glissement,' showing the terminal purse-string Suture (Bonnet and Petit).

steps, vaginal fixation, anterior colporraphy, and perineorraphy, but Edge advocates double lateral colporraphy, combined with vaginal fixation and perineorraphy. His directions for preparation of the patient are of practical importance in all operations of this nature.

'The patient must be prepared as for a major operation. She must take an aperient two days before the operation, and again the night before if necessary. The vulva and genital canal should be well douched, the prolapsed parts scrubbed with 1 per cent. lysol solution thrice a day, and a plug soaked in lysol

solution left in the vagina during the night. On the eve of the operation she has a large simple enema, and this is repeated in the morning one hour before the operation. After the last enema has acted, the patient must take a warm bath, soaping herself well, and then put on clean linen. The bedclothes are also changed during the bath. On the operation morning the patient must take nothing beyond a cup of weak tea. The patient must accustom herself to pass her water while lying, so that the catheter may not be required after operation.'

Firstly, the uterus is curetted and disinfected; secondly, redisinfection of operator and assistants, and thorough cleansing of vagina and vulva; thirdly, vaginal fixation as far as the insertion of the sutures; fourthly, double lateral colporraphy as far as insertion of the sutures; fifthly, tying of both sets of sutures. Continuous sutures of the finest silk are used for the colporraphy. Silkworm gut is employed for vaginal fixation and perineorraphy. The vaginal fixation sutures are removed after six or eight weeks, the perinæal after a month.

Lateral Colporraphy.—In this operation, a zone of the vaginal mucous surface at both sides of the canal is denuded from the caruncula myrtiformes as far as the neck of the uterus. The extent of the denudation, however, must depend on the degree of vaginal prolapse. The anterior and posterior vaginal wall are united by sutures which are passed obliquely, and embrace all the cellular tissue.

Elongated Cervix, Complicating Prolapse of the Uterus or Vagina.—I do not intend to enter into the various matters in dispute regarding the relation of the hypertrophic elongation of the cervix uteri to prolapse of the uterus or vagina. I shall simply limit any observations to such practical points in the etiology and diagnosis of the affection as are requisite for every student and practitioner to know. The following facts, which are now generally accepted, have a practical bearing on the management of this condition:

1. The cervix uteri may be hypertrophied and lengthened out either in its infra-vaginal or supra-vaginal portions. Whether this elongation be a primary growth (Huguier), independent of any dragging action of the prolapsing vagina and bladder, or a consequence of this latter, is a matter of dispute. Taylor considers that it is the result of non-involution of the uterus after labour, when the uneffaced infra-vaginal

cervix drags on the non-glandular isthmus and draws it out. He does not believe in the commonly accepted doctrine of the effacement of the glandular cervix during pregnancy, and is of opinion that it is simply hypertrophied and temporarily expanded.

2. Elongation of the infra-vaginal portion of the cervix is not, as a rule, attended with prolapse. The fundus remains at its proper level in the pelvis, nor does the os descend so far as to protrude. There is a peculiar elongation of the anterior lip accompanying this condition, known as 'tapiroid.'

3. Hypertrophic elongation of the supra-vaginal portion is, sooner or later, associated with prolapse and procidentia of the uterus and bladder. There are here two principal factors—growth and traction: which is the initial process we will not attempt to say. It would seem rational that each has an independent share in the early stages of the distortion. It is difficult to define the exact spot where the 'vicious circle,' as Goodell aptly terms it, commenced.

4. Eversion of the lips of the os uteri, with exposure of the cervical canal, and laceration of the cervix, are common attendants on this form of prolapse of the womb.

Causation. — The most frequent causes of hypertrophic elongation of the cervix are: subinvolution of the uterus after labour; injury to the cervix during labour, and laceration of the cervix (in these two latter conditions we find the two associated states which usually produce hypertrophic change, viz., hyperæmia and hyperplasia); fibroid tumours; pelvic adhesions; uterine displacements; laborious occupations.

Treatment.—Replacement and support, and similar operations to those resorted to in ordinary prolapse; amputation of the cervix by the knife, galvanic knife, galvanic wire, or écraseur. The operation of Sims I have already referred to.

Ascent of Uterus.—The uterus recedes from the reach of the examining finger under two important conditions: It is well to bear in mind in practice that this recession of the uterus may be associated with (*a*) pregnancy; here we have

(after the third month) the other local signs of pregnancy; (*b*) ovarian tumours—frequently in ovarian disease the uterus is not only drawn up from the pelvis, but the cervix is shortened, and the os uteri may be felt almost on a plane with the vaginal roof; (*c*) fibrous and fibro-cystic disease of the uterus; (*d*) abdominal tumours (springing from or connected with the abdominal viscera), as hydatid tumours, cystic growths, malignant disease; (*e*) peritoneal effusion (hæmorrhagic, serous, or purulent), pelvic and abdominal, with consequent adhesions; (*f*) pelvic tumours, occurring in connection with the rectum or vagina, or in Douglas' space. It is a matter of considerable importance in arriving at a diagnosis, when we discover a receding uterus, to determine carefully its cause.

Operations for Vaginal Prolapse.—The operations for prolapse of the vaginal wall may be considered in connection with prolapse of the uterus. This vaginal prolapse may be attended by a rectocele or a cystocele. In the one case, the rectum protrudes into the vaginal canal, and may be dragged down with it outside the vulvar orifice. In the other, the bladder accompanies the prolapse, frequently occupying portions of the procident mass. The position and direction of the urethra is altered (Figs. 188, 189).

The pathology of this condition we have considered in relation to prolapse of the uterus (pp. 249-254). There is little difficulty in detecting either anomaly. A soft bulging swelling is felt, posteriorly or anteriorly, pressing into the vaginal canal, or appearing at the vulva, and the diagnosis is further verified by introducing the left forefinger into the rectum, while the right is made to oppose it from the vaginal surface. The catheter or sound may be used for a similar object in the instance of a cystocele.

Operations intended to produce Contraction of the Vaginal Canal (*Colporraphy or Elytrorraphy*).—The principle of these operative procedures consists in the removal from the vagina of portions of the mucous membrane from the anterior or posterior wall, or from both. The shape of the portion

removed, whether the triangular form of Sims, the variously fashioned surfaces exposed by Emmet, the pentagonal of Simon, or the oval denudation of Dieffenbach, is of secondary importance. Sims' operation (colporraphy) is that perhaps most frequently performed.

As the simplest of operative measures, that of Marion Sims may be selected. It consists of the following steps: First, the anterior wall of the vagina (which is the primarily prolapsing portion) is hooked up and drawn well towards the posterior wall; secondly, with Emmet's or Sims' scissors, a V- or trowel-shaped portion of the mucous membrane is removed, the apex at the neck of the bladder, and the arms extending to

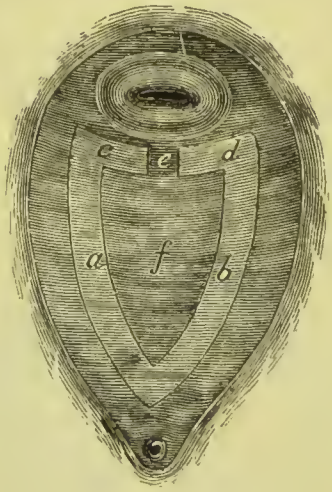


FIG. 218.—Sims' Operation.

the sides of the cervix uteri; thirdly, the denuded surfaces are brought together by sutures (of silver wire or silkworm gut) passed transversely. Sims, in his later operations, left a small portion of undenuded tissue at (*e*) to permit the escape of any pent-up secretion.

It has to be remembered that we have three distinct abnormal states to consider in connection with this operation: primary prolapse of the vagina (antecedent to the prolapsus uteri), hypertrophic elongation of the cervix, and prolapsus uteri. Associated with the descent of the uterus are the two

fundamental errors—want of vaginal support, and uterine traction. Increase of uterine weight is the third most important factor. No operation can carry with it the assurance of correcting all these conditions, nor yet a series of operations. Hence we can give no guarantee of any permanent result.

The denudation of the vaginal mucous membrane may be effected with either scissors or bistoury. If care be taken, the scissors has certain advantages. I prefer to employ both

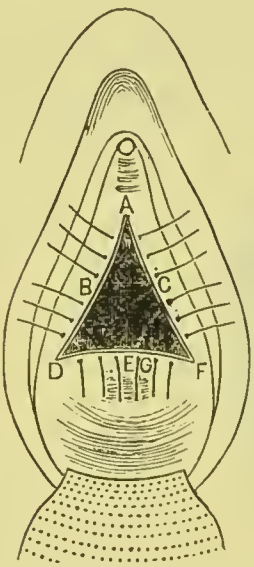


FIG. 219.—Anterior Colporraphy, showing the sutures that close the thin angles (Doléris).

FIG. 220.—Anterior Colporraphy, showing the passage of the final suture, *u*, *r*, *x*, *y* (Doléris).

methods at different stages of the operation. Good gut ligatures are the best to use. Simon performs anterior colporraphy by the removal of an oval portion of the vaginal mucous membrane, the poles of the oval being pointed and brought to an acute angle. The long diameter of the denuded surface corresponds to the relaxed portion of the vaginal wall. The shape of the flaps, however, must depend in great measure upon the size and situation of the prolapse. The boundaries of the apex, nose, and sides of the proposed raw surface are limited by fixing forceps. The number and direction of the

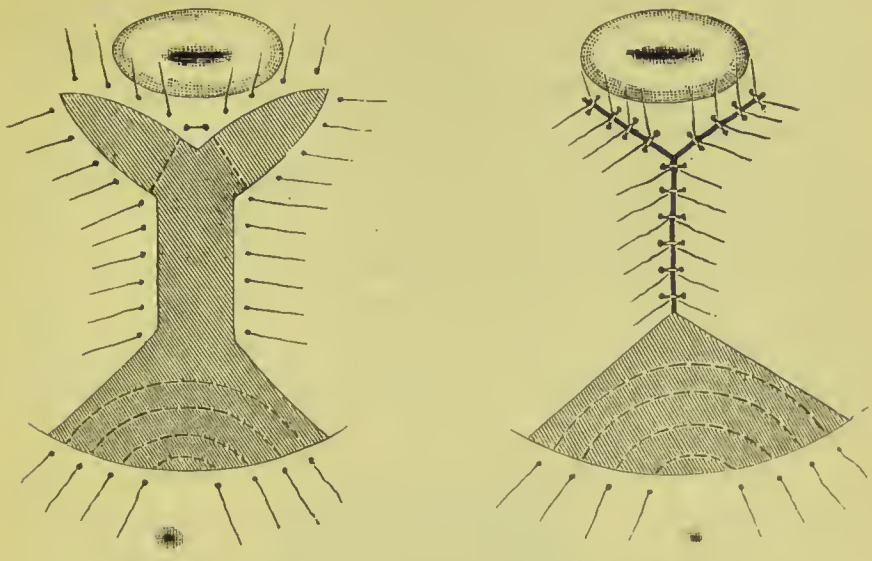


FIG. 221.—Reamy's Operation for Rectocele.

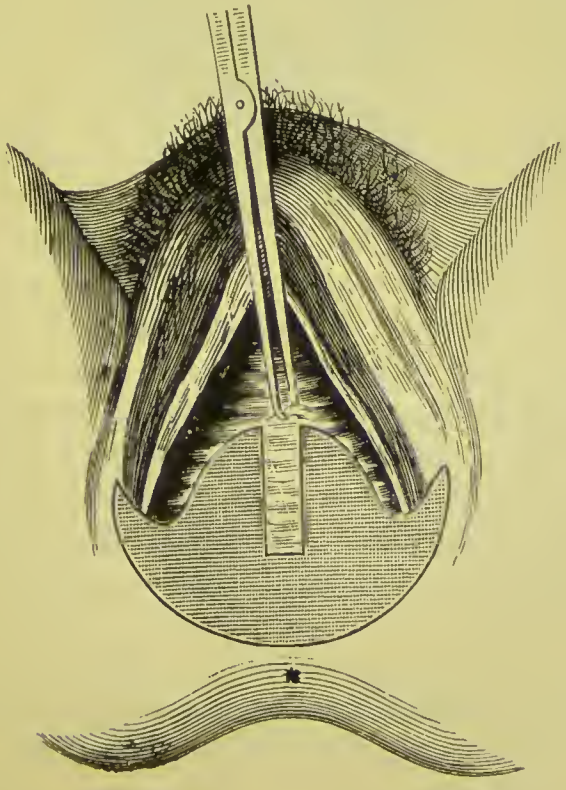


FIG. 222.—Colpoperinæorraphy (Martin's method).

sutures will depend upon the size and shape of the colporraphy. In all these operations, it is essential to operate with celerity, and to restrain the hæmorrhage by irrigation with hot water.

Colpoperinæorraphy.—Various procedures are practised with a view of curing a rectocele and a prolapse of the vagina. When such a prolapse occurs with a lacerated or deficient perinæum, colpoperinæorraphy is performed.

Rectocele has been treated by Reamy by an operation, the principle of which is shown in Fig. 221. The desired extent of surface of the posterior wall of the vagina is denuded, as shown in the drawing, two arms of the wound being carried upwards and outwards at each side of the cervix. Catgut ligatures are used. A most important suture is that shown by the dotted lines crossing the upper wings of the wound; this suture is carried from the angle formed by one extending arm with the denuded surface on the posterior wall, to the angle of undenuded surface beneath the cervix. It is drawn out here and reintroduced at a corresponding point of the apex, about one-fourth of an inch from its point of emergence, and is carried across the denuded arm. It is brought out a quarter of an inch from the margin at a corresponding spot (in the opposite angle) to the point of entrance. This suture brings the three angles of the wound together (Fig. 221, p. 279).

The form of Hégar's operation is triangular, with the apex at the neck of the uterus, and the base at the perinæum. That of Martin is shown in Fig. 222. The denuded surface is divided into two portions by a column of mucous membrane, which he purposely leaves. Martin closes the vaginal wound before he vivifies the perinæal edges. There is danger of non-union occurring through the untouched central column of mucous membrane.

Amputation of the Cervix.—This operation should be the last resort of the surgeon for prolapse, and is mainly performed on those advanced in life. The best method of removal is by means of the knife or scissors (not the écraseur or galvanic wire). The stump is covered with the vaginal tissue (Sims)

by means of silver sutures, four to six, passed from before backwards through the cut edges of the vagina. Thus we leave a small oval opening corresponding to the cervical canal. Emmet drew particular attention to the evils which accrue to the woman if the stump be allowed to heal by granulation. These are partially due to contraction or closure of the uterine canal and subsequent re-enlargement of the uterus, and partly to reflex irritations and the effects on nutrition.

Schroeder's Operation.—I avail myself here of Petit's description of the steps of this operation. We require for it a duck-

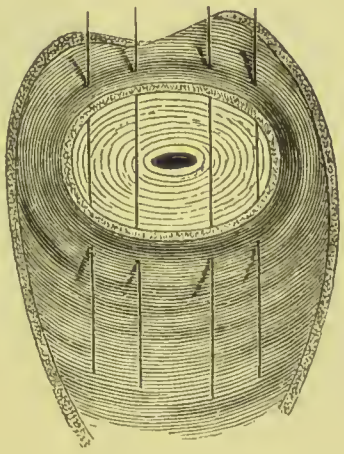


FIG. 223.—Amputation of the Cervix (Sims).

bill speculum; two vaginal retractors; two long-toothed forceps; two bistouries, with short broad blades; a pair of straight and strong scissors; a dozen small torsion forceps; a few toothed dissecting forceps; an irrigator; special needles, flat and curved, with needle-holder; catgut and silver wire; and a receptacle for the irrigating fluid. The neck, which is drawn down and held firmly by an assistant, is bilaterally divided as far as the vaginal fold. The divided lips are then well separated, and a curved incision, with the convexity anteriorly, is made at each angle. Another semicircular incision is now carried to the depth of some millimetres through the uterine tissue, from one angle of the denuded anterior lip to the other;

and the bistoury being then turned flat in the groove, it is carried through the uterine neck at right angles to the transverse incision, leaving thus a large raw surface, as shown in the figure. This angle is then united by three sutures. The curved needle of Sims is carried in the manner shown in the drawing beneath the exposed surfaces, entering at a short distance from the margin of the first incision, and emerging at the upper third of the larger flap, to be re-entered again at the lower third. The central suture, before tying, is

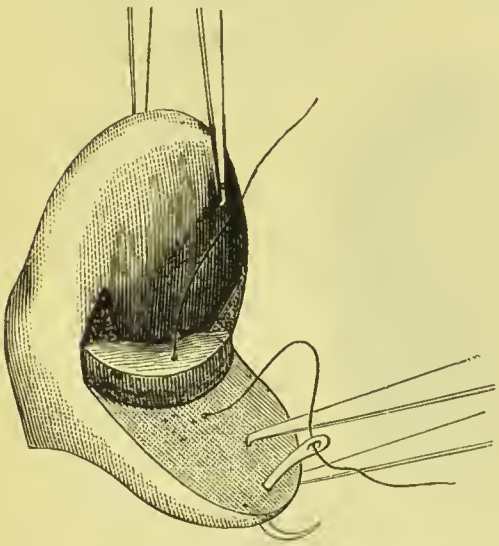


FIG. 224.—Schroeder's operation of Amputation of Vaginal Cervix, showing the track of the central suture across the excised lips (Bonnet and Petit).

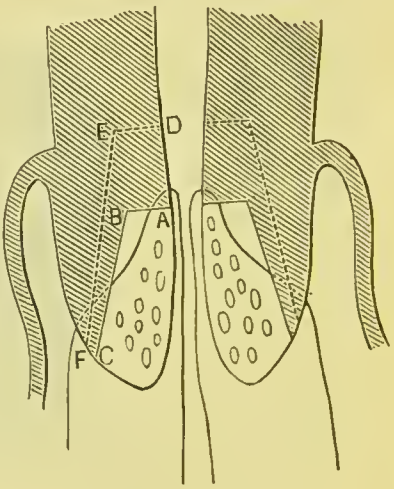


FIG. 225.—Sectional view of same. A, B, C, exposed surfaces of flap; D, E, F, track of supra-vaginal incision; A, F, suture.

shown in Fig. 224. This one is first inserted; the three are caught in a torsion forceps, and left, while the anterior lip is being treated in the same manner. When the two denuded lips have been sutured, they are drawn asunder by the threads, and the borders of the lateral incision are freshened. These are next carefully united at either side by suture. Atresia is prevented by securing the exact adjustment of the cervical and vaginal mucous surfaces of both lips, and by preventing any intervening protrusions between the sutured points. Also the external os uteri is made slightly larger than natural, and is

kept open at the close of the operation by the insertion of some iodoform gauze.

Simon Markwald operates by the removal of a cone-shaped portion of each lip, with the base below. These two flaps are united by catgut sutures, and the lateral incisions are brought together as in Schroeder's operation.

Various other operative procedures are practised in extreme cases of vagina procidentia, such as *episiorraphy* (Le Fort), *fixation of the vagina* (Péan), *colpohysteropexy* (Sänger, Nicolétis, Richolet).

Episiorraphy is closure of the vaginal opening. It may be occluded to the extent of complete closure, a space being left for the passage of the urine; or it may only be so contracted as to permit of coitus. Le Fort bares two rectangular surfaces—one on the anterior, and the other on the posterior, wall of the vagina, and unites these by sutures. Péan fixes the vagina to the rectum behind, and to the bladder in front. In *colpohysteropexy* the neck of the retroverted uterus is amputated, and the posterior vaginal wall is fixed to the anterior edge of the uterine stump. Three catgut sutures are used to attach the posterior half of the uterine stump to the posterior lip of the vaginal incision. Other sutures pass, at each side, from this same lip to the anterior edge of the uterine stump, and these include the vaginal mucous membrane, so as to cover the lateral portion of the uterine surface with it. The remaining margins of the vaginal wound are then brought together by sutures. The operations of Byford, Rahenan, and Jacobs are but modifications of these methods (anterior and double colpohysteropexy).

Total Extirpation of the Uterus with Colporraphy for Total Prolapse.

Wolff has recorded the results of eighteen operations in ten years at the Dresden Poliklinik, the ages of the patients varying from thirty-nine to seventy-eight. Leopold operated on seventeen of these cases. There were three deaths after operation. Two of these were accounted for by pneumonia and cardiac syncope, due to hypertrophy and dilatation. The subsequent histories of twelve cases were traced. All these were in good health, and able to work.

In regard to this radical procedure, which has not hitherto found many advocates in this country, we would quote the dictum of Wolff himself, viz.: '*The danger of a surgical proceeding should be at least not greater than the danger to life of the condition which the operation is destined to cure.*' When we find that a mortality of 16·6 per cent. followed the performance of the operation in the most capable hands, we may well pause before advising so radical a measure for a condition which in itself is not dangerous to life, notwithstanding its consequences and inconvenience. Some operators, as in the case in question, appear to think that the hastening of a patient out of the world through the influences exerted by an operative procedure on some collateral or organic disease in the viscera to which she may have been a victim, such as disease in the heart or lungs, is justifiable. Surely to perform ablation of the uterus, and a protracted operation on a patient with emphysema of the lungs, with cardiac hypertrophy and dilatation, is only to bring the gynæcologist's art into disrepute. In people advanced in life, in whom such extreme prolapse exists as to demand so formidable an operative step, there must commonly be present such constitutional errors, or positive organic changes in the lungs and heart, as absolutely to contra-indicate it. At least, the less dangerous steps of colporraphy and abdominal fixation should first be tried, when we have failed with all forms of support to give relief, before we advise the removal of the uterus.

CHAPTER XII.

UTERINE DISPLACEMENTS (continued).

INVERSION OF THE UTERUS.

By inversion of the uterus we simply mean a turning of the uterus inside out. It is partial or complete, acute or chronic. There are two stages of partial inversion (Crosse): (1) *depression*, (2) *introversion*. The fundus is received into the cavity of the uterus, ultimately reaching to the os uteri; the intruding fundus is grasped by the uterus, and the process of intussusception is continued until the extrusion of the fundus from the os uteri occurs. Once this has happened, the protrusion of the fundus and body of the uterus from the os uteri may continue until the cervix and lips of the os uteri itself are inverted.

Inversion may be met with in practice either as a sudden occurrence or as a chronic condition. The former accident is more fully discussed in works on 'Midwifery.'

The essential—as it always is the predisposing element—in inversion is an atonic state of the uterine parenchyma, favouring relaxation of the muscular fibres. This leads to partial prolapse of a portion of the uterine wall, and is associated with an irregular contraction of the surrounding muscular tissue. The prolapsed portion is treated by the uterus as a foreign body, like a piece of placenta, or the hand; it excites contractions which end in expulsion of a part or the whole of the fundus. This view (Rokitansky) is not inconsistent with the possible and occasional origin of the inversion

at the cervix uteri (Taylor and Klob), which latter is inverted and protrudes into the vagina.

Causes.—Atony of the uterus, in whole or part, is produced by (1) parturition, (2) tumours and polypi, (3) placental adhesions, (4) hæmorrhage. The process of traction of the uterine wall is associated with the first three of these; hæmorrhage is a consequence of all three. If there be general re-

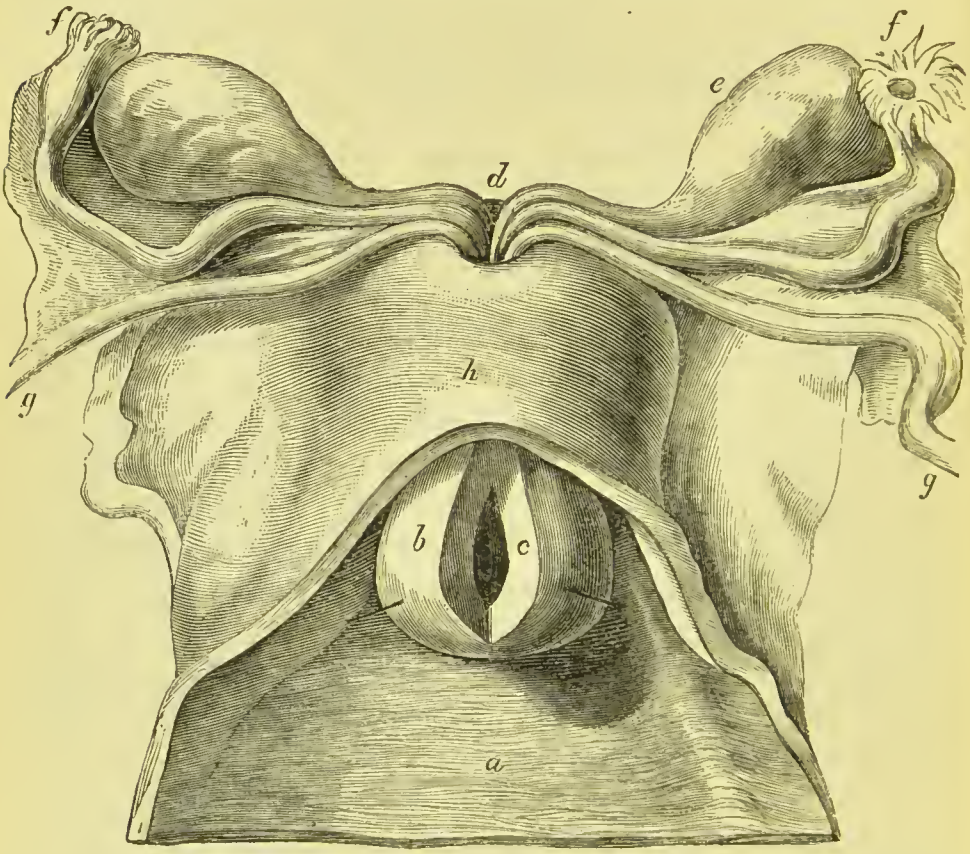


FIG. 226.—Inversion of the Uterus. *a*, vagina; *b* and *c*, inverted uterus, incised to show the cavity; *e*, *f*, *g*, ovaries, Fallopian tubes, and round ligaments; *h*, cervix covered by peritoneum. Two-thirds size, after Crosse, in Musée Dupuytren (Robert Barnes).

laxation of the uterus, such an exciting cause as any violent exertion, or severe coughing, might be sufficient to produce a slight inversion or depression, and give the first impetus to the morbid process. It would appear that inversion of the virgin uterus may take place (Puzos, Boyer, Baudelocque, Langen-

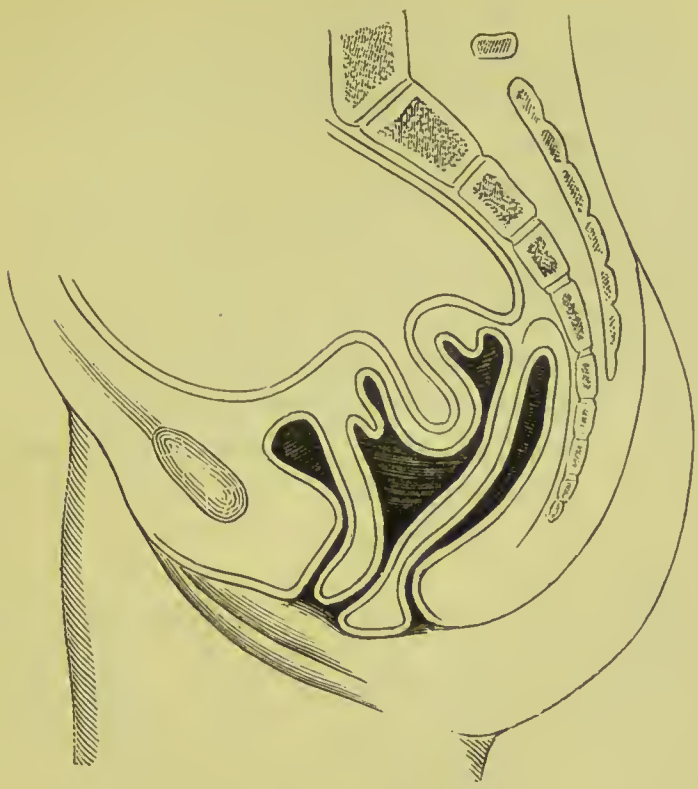


FIG. 227.—Partial Inversion of Uterus, 2nd degree (Bonnet and Petit).

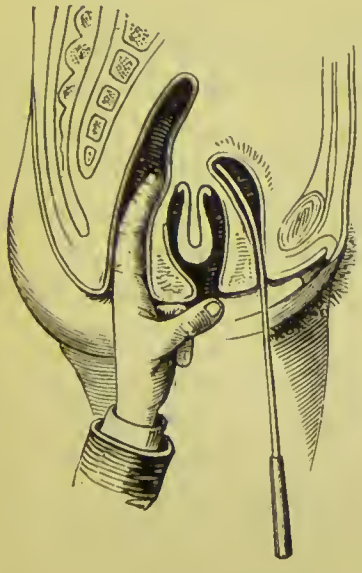


FIG. 228.—Conjoined Examination—Inverted Uterus.

FIG. 229.—Prolapsus Uteri (Schroeder).

beck). Goodell believes that ectropion of the cervical mucosa may occasionally follow the general relaxation consequent upon sterility, and masturbation in young girls, and thus start the inversion process.

Aveling thus classified inversion :

Automatic or Fundal.	Result of inherent muscular contraction. Placental—tumour.
Systemic (generally Cervical).	Result of extraneous abdominal and respiratory muscular contractions when there is inertia of the body and relaxation of the os.
Mechanical (Propulsive or Extractive).	Result of blows; manual compression; abdominal pressure from viscera or fluid or gas; traction exercised on or by cord or tumour.

Signs and Symptoms.—These are : the presence of a tumour, generally not voluminous, felt in the vagina, simulating polypus, attended frequently by hæmorrhage, either constant or periodical ; bearing-down pains ; pain occasionally in walking; perhaps rectal and vesical distress. Anæmia is a common attendant, from the associated loss of blood and general debility.

Differential Diagnosis.—The main proofs we rely on that a tumour in the vagina is an inverted uterus are : (1) the presence of a soft, readily bleeding and sensitive tumour ; (2) the absence of the uterus from its position in the pelvis ; (3) the absence of the normal uterine opening, and the impossibility of passing the uterine sound farther than the neck : the finger feels the cervix at the summit of the tumour, perhaps thinned out to a ring.

In Complete Inversion.—We examine a case of suspected inversion, differentiating it from polypus or procidentia ; in the instance of partial inversion, for intra-uterine fibroid. Having made a careful digital examination of the size and consistence of the tumour, we explore it through the rectum and detect the absence of the uterus. By conjoined examination we confirm this. We take the uterine sound, and find it

arrested at the neck of the uterus, round which we sweep it: it may pass just inside the cervix for the extent of an inch or an inch and a half. The sound is now passed into the bladder, and the finger into the rectum, and by the recto-vesical examination the fact that the uterus is absent may be ascertained.

In Partial Inversion.—This is much more difficult to diagnose. The difficulty is to distinguish from an intra-uterine fibroid. By the conjoined examination we may detect the absence of the fundus. On passing the sound, it is arrested by the prolapsed portion of the uterus, which is sensitive. In the fibroid growth the uterus is enlarged, and the sound passes

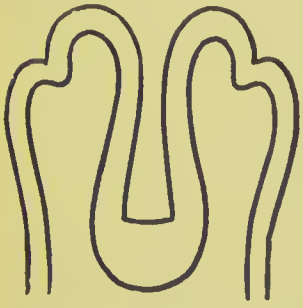


FIG. 230.
Outline Diagram of Complete Inversion (adapted from Thomas).

FIG. 231.
Outline Diagram of Partial Inversion (adapted from Thomas).

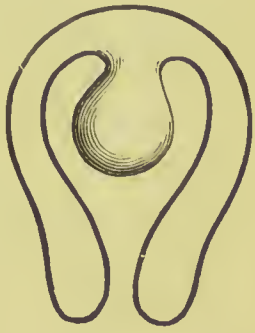


FIG. 232.
Outline Diagram of Polypus at summit of uterine cavity (adapted from Thomas).

farther than in the normal uterus, while the tumour is painless. The history of the two is different; the fibroid growth is slow —there is no relation to parturition. Inversion occurs, as a rule, suddenly, and the uterus is sensitive.

Prognosis.—The prognosis must be always grave. Even admitting, says Thomas, the undoubted authenticity of the cases reported, spontaneous reduction must be regarded only as a curiosity, and not as a process to be anticipated. The patient may be worn out with pain and exhausted by hæmorrhage.

Treatment.—This may be briefly considered under three heads: (*a*) palliative; (*b*) taxis and pressure; (*c*) amputation.

Palliative.—Strong astringent preparations of alum, tannin, perchloride and persulphate of iron, matico, hamamelis; daily injections of very hot water; ergot given internally. Aran, in very bad cases where amputation was indicated, used the Paquelin cautery, or potassa cum calce, to the surface of the mass. In this manner the course of nature, when the uterine mucous membrane thickens and becomes like skin, is imitated. The patient lives on without much pain or inconvenience.

Taxis and Pressure.—This must in very old cases be assisted by the local application of cocaine, in the form of ointment and suppository. The vagina is previously dilated by hydrostatic bags, and possibly two or three small and superficial longitudinal incisions through the tissue of the cervical ring. But the great danger of the employment of force has to be remembered; the vagina may be ruptured, or fatal peritonitis result. 'A small hand,' says Thomas, 'a cautious, unexcitable mind, and constant vigilance, during all the efforts by taxis, must be combined with thorough knowledge of the subject.' 'I confess that I should prefer to trust a patient in whom I felt great interest rather to the operation of abdominal section (for the reduction of the tumour), than to that of prolonged taxis at the hands of a rough, unintelligent and inexperienced surgeon.' If this be his deliberate opinion, after a personal experience of nine cases of inversion, it is not necessary to dwell on the care and caution with which attempts at reduction of the chronically inverted uterus must be made.

The ordinary practitioner is not likely to attempt this operation without mature consideration and careful consultation. The principal obstacle to be overcome is the constriction of the cervical ring, through which has to be returned the enlarged and hardened uterine body. I shall only refer here to two modes of manipulation. Few surgeons would attempt the bold step of Thomas, viz., abdominal section, in order to dilate the cervix from the peritoneal side with a sort of steel glove-stretcher. In fact, in practice it would be far better to trust to

continuous pressure than run the risk of any dangerous force or prolonged manipulation. Before an attempt at reduction be made, the rectum and bladder should be emptied, and an anæsthetic administered. The nails of the operator's hands are carefully pared, and the operating hand is well oiled. One hand must be laid on the abdomen, over the situation of the ring of the opposing cervix. With this counter-pressure is maintained against the hand operating in the vagina. The axiom so strongly insisted on by the late McClintock of Dublin is to be remembered, of returning first the part which

FIG. 233.—Reduction of Inverted Uterus (Emmet).

has inverted last. Emmet's plan is then adopted. The patient is placed in the lithotomy position; the inverted uterus is grasped between the finger and thumb of the right hand; the fingers of the left hand maintain steady counter-pressure on the abdomen. The inverted fundus is pushed steadily upwards with the right hand, while the fingers are used to dilate the cervix. If the case be comparatively recent, the plan of dimpling with the fingers the fundus, and forcing the indented wedge thus formed into the cervical ring, and so overcoming the resistance, may be tried. Repositors of different kinds have been used. The figure shows the cup-repositor of White. The cup is steadied with the right hand against the fundus,

and the force is applied by means of a spiral spring, which the operator presses against the chest, counter-pressure being maintained by the left hand over the cervix on the abdomen.

Pressure.—If from the duration of the case, or from the experience of moderate manual efforts at reduction, we deem it inadvisable to proceed with the taxis, it is better at once to try continuous elastic pressure. Aveling, Robert Barnes, and Braxton Hicks are the prominent advocates for continuous

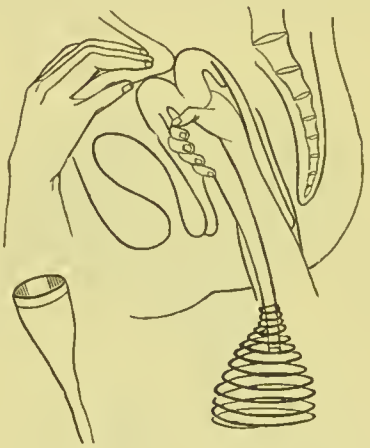


FIG. 234.—White's Cup Repositor (Thomas).

pressure in this country. The stem and cup of the former may be used for the purpose. The curved stem has at one extremity a cup-shaped disc of rubber, or a hollow cup of caoutchouc. The other end of the stem has four strong rubber bands, attached to the abdominal belts, which serve to maintain the pressure on the fundus. By tightening the back or front bands, the direction of the pressure is changed. Counter-pressure is secured by an abdominal pad placed under a broad flannel roller. The position of the cup and the direction of the stem are watched from day to day. It is well to carefully pack the vagina, round the inverted uterus, and also the cup when applied, with a tampon of antiseptic wool soaked in oil. Robert Barnes advises periodical attempts at reduction with the hand, under chloroform, when the cup is

removed. Should the continuous pressure give rise to pain, or there be any sloughing, it must be relaxed, and an interval of rest permitted. Its tolerance may be assisted by the administration of bromide of potassium and chloral. The application should be made between the menstrual periods. Should a tumour complicate, or be the cause of, an inversion, we must remove it, and then endeavour to rectify the inversion.

Noeggerath's method consists in the indentation of one corner first, assisted by counter-pressure over the ring of inversion from above the pubes.

As regards the time after the occurrence of the inversion at which successful reposition may be attempted, this varies, Aveling's opinion being that every case of chronic inversion of the uterus is curable.

Fancourt Barnes recorded a case of inversion of the uterus, of four months' standing, successfully restored in eight hours by means of Aveling's repositor.

Jaggard has recorded a case of twenty months' standing reduced, after thirty-three days, by colpeurysis.

Aveling has treated and cured eleven cases of chronic inversion by his sigmoid repositor. Each case took on an average 40 hours for its cure—the longest time occupied being 54½ hours, and the shortest 9 hours. The following are Aveling's instructions for its use :

Directions for Using the Sigmoid Repositor.—Having diagnosed inversion, determine by touch the size of the fundus, and select a cup of proportionate size. It should be in diameter slightly less than that of the fundus. Next apply the belt round the waist, and then the braces over the shoulders, and fasten them by safety-pins to the belt. This should be done in such a way as to leave room to pass the tapes, to which the rings are attached, between the pin of the safety-pin and the belt. Now the cup of the repositor should be applied to the fundus uteri, and held firmly in position by an assistant while the rings are adjusted, two being taken in front and two behind. The ends of the tapes should next be passed between the safety-pins and the belt, parts of the tapes drawn through, and a knot made at the ends to prevent them slipping back. Tension may be lastly exerted by drawing the tapes up through the pins and fastening them at any point by tying a loop. This loop can be easily pulled out and retied, should more or less tension be required. Care must be taken to have the tension equally distributed ; for if the front bands be tighter than the back, there arises the risk of the cup being slipped back off

the fundus ; and the opposite may occur if the posterior bands be tighter than the front. The indiarubber bands passing to the front should be carefully laid outside the labia and packed with cotton-wool. If the patient be restless or complain of pain, morphia may be administered. She should be carefully watched, and the urine drawn by catheter when necessary. It is difficult to lay down any rule for tightening and loosening the tapes. This will be determined by the practitioner, who must judge by the existing tension, and the tolerance of it by the patient. In my last case, re-inversion was accomplished without the tapes being touched after their first adjustment.

Reduction takes place by the cervical method. Pressing on the fundus causes counter vaginal traction on the cervix, making it unroll gradually until

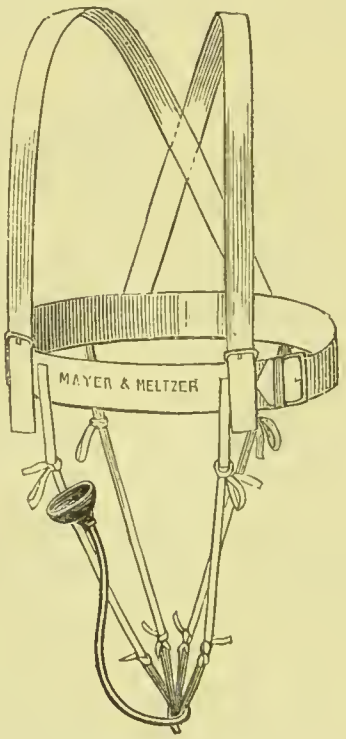


FIG. 235.—Sigmoid Repositor.

the inner os is reached, where a little delay is caused by its being less dilatable. When this point is passed, the body of the uterus soon opens, and admits the cup. The last step must occur rather suddenly, for all patients say they feel that something has 'given way,' and comparative comfort is the result.

When the inversion has been reduced, the sooner the cup is withdrawn the better, for the cervix immediately begins to close round the metal stem, and the cup becomes firmly grasped in the uterine cavity. The easiest way of removing the cup is to tilt it on end, and bring it through the os as you would a button through a button-hole. If it should have been long retained, an anæsthetic will assist. When the cup has been removed, pass a thick sound into the uterus, and, by pressing the point of it forward, the rounded fundus will be felt through the abdominal walls. Being satisfied that complete re-inversion

has taken place, syringe out the uterine cavity with iodine water at 120° Fahr., which will cleanse its surface and make the whole organ contract.

'I think,' says Aveling, 'after considering these facts, you will come to the conclusion that every case of chronic inversion of the uterus can be cured by sustained elastic pressure exercised in the right direction; and I hope you will not think me too sanguine when I state my belief that the mutilation of a woman, by removing her uterus, will no longer be necessary in consequence of the impossibility of replacing this important organ when inverted.'

Amputation.—I do not enter into the various arguments with regard to amputation. I would wish, however, to quote

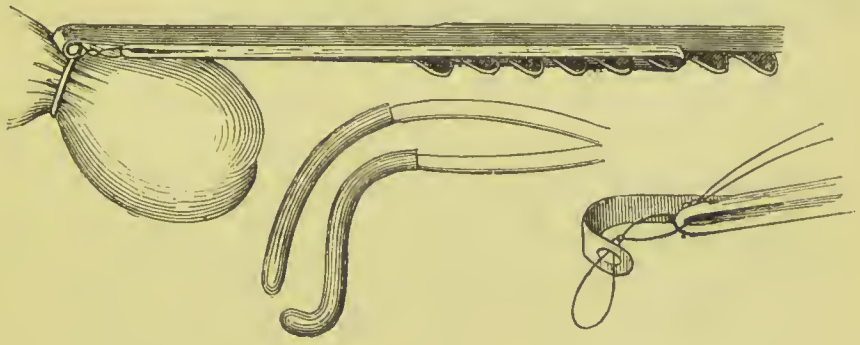


FIG. 236.—Périer's Appliance for Amputation by Elastic Traction (Bonnet and Petit).

the view of Emmet in regard to this *dérnier ressort* for inverted uterus. Having discussed the chances of success by various methods of reduction, he says: 'With our present knowledge, I would not advocate the operation unless the life of the patient was in jeopardy, and the choice rested between it and amputation.' The older modes of operating included the application of an elastic ligature, galvano-cautery wire, écraseur, or scissors. Amputation by elastic ligature (Périer) is now performed by clasping the uterus high up with an encircling forceps covered with rubber, with which it is drawn well down to complete the inversion (Fig. 236). The fundus is next surrounded with a loop of strong silk below the claws of the forceps, and the ends of the ligature are included in the eye

of a long, cog-handled stem, which is so constructed that, by means of the cogs in the handle, it tightens firmly the ligature, which is secured by a double knot. By the same silk thread a ring of elastic rubber is adjusted against this constricting loop of silk with another triple knot. The elastic ligature is finally stretched on the cog of the stem, and the uterus is restored to its position in the vagina. The ligature is tightened from time to time, and the uterus separates from the ninth to the fourteenth day. Most careful antiseptic precautions are taken during this interval, and the pain, which is sometimes very severe, is relieved by injections of morphia. Kaltenbach secures the fundus by ligatures of silk and elastic, and cuts off the portion of the uterus below these.

LEEDS & NI S R DING
MEDICO-CHIRURGICAL SOCI

CHAPTER XIII.

UTERINE REFLEXES.

A FEW observations on the subject of uterine reflexes may not be out of place now that we have considered those conditions which are mainly associated with such reflex disturbances.

The connections between the vagina, uterus, and ovaries, through their nervous supplies, with the splanchnic nerves, and with the spinal cord in the sacral and lumbar regions, through the pelvic and hypogastric plexuses, anatomically explain many of the reflex phenomena that follow upon stimulation or irritation of the ovarian and uterine nerves consequent upon disease in the ovaries or uterus.

The reflex connection between the mammary gland and the uterus, and between the sciatic nerve and the uterus, shows that this reflex association is established between the uterus and such a distant part as the nipple, and with peripheral nerve-trunks, as those of the sciatic. And in whatever light we look upon ovulation, or the part played in it by the uterus and Fallopian tubes, and the various physiological effects brought about by it on the entire being of the woman, the consequences which follow a deviation or interruption of that process are but constantly recurring demonstrations of the physiological effects which are produced under its influence in almost every organ in her body.

As examples of this, we may take the occurrence of varying shades of optic neuritis and retinal irritation in connection with suppression or irregularity of the catamenia; neuralgic

pains in the eyeball associated with the menstrual epoch, neuralgia of the supra and infra orbital nerves, slight epileptiform seizures of the facial muscles, toothache and dental neuralgia,* laryngeal migraine and functional aphonia, or paresis of the intra-laryngeal muscles, milder forms of hypertrophic rhinitis, and similarly, tinnitus aurium and vertigo, sympathetic neuralgia and temporary congestion of the mamma. And as consequences of menstrual irregularities, we find irritation of the dorsal and lumbar painful spinal zones, herpetic eruptions of the skin, functional irregularity of the cardiac rhythm, gastralgia and nausea, slight icteric attacks, atonic or irritable states of the intestines, irritation of the bladder, with increased frequency of micturition, pains in the branches of the lumbar and sacral nerves; varieties of headache, and severe hemicrania. All such symptoms may be accounted for by reflex vaso-dilating or vaso-contracting effects produced by irritation arising in the uterus or ovaries, as the result of arrested or imperfectly discharged physiological processes.

The ready response of the uterus to such stimuli as an anæmic blood current, or one in which there is an excess of carbonic acid, is an established physiological fact, and the influence of such reflex impressions as are conveyed by a cold hand on the abdomen, or friction of the mammary gland, has been obstetrically availed of from early times. How readily its catamenial functions are disturbed by such causes as mental or physical shock, cold and heat, we are all familiar with. So it must happen that an organ so susceptible to any direct or reflected stimuli will, in the many varying states of a woman's health, or the accidental occurrences of her daily life, respond quickly to these influences. The physiological pain, and the much-debated 'spasm' of dysmenorrhœa, having no apparent cause in ovary or uterus, but for which we find a ready explanation in an anæmic or toxæmic blood-supply, as the cause of those contractions or 'spasms' that attend on the 'obstructive' form of dysmenorrhœa, are thus explained. It undoubtedly *is*

* See p. 144.

true, as insisted on by Clifford Allbutt, that the ill-health of the woman is the cause of the ill-health of the uterus in many cases. It is equally true that the ill-health of the uterus or ovary is frequently the first step in the general deteriorating process, and as it originates, so it maintains it. All we know of the physiology of uterine action compels us to regard the uterus and ovaries as the strongest links in the chain of the woman's health of mind and body. Weaken them as you may from without or within, and you immediately, but fundamentally, touch all the mainsprings of her life.

There has not been one of these functional disturbances that I have not from time to time seen and treated, in which the association with disorders of menstruation was not clearly to be traced. And if this be so in the instance of aberrant physiological functions, how much more likely are we to have such consequences following gross pathological changes in the uterus and appendages. And this we find to be practically the case.

In prolonged disorders of the uterus, resulting in enlargement, hyperplastic deposits, or a process of fibrosis following on arrested involution, in those secondary pathological conditions attending upon lacerations of the cervix, in deep erosions, in unrelieved versions and flexions, in tubal enlargements and displacements, and in chronic affections of the ovary, as sequelæ of pregnancy, we find not only these reflex conditions present, but more aggravated pathological consequences and more serious disturbances of function. We have this association exemplified in the eye in the results of thrombosis or embolism, as retinal infarctions or extravasations with their secondary consequences—atrophy and partial or complete loss of vision; in the nose, in epistaxis, chronic nasal catarrhal states and perversions of smell; in the ear, in labyrinthic apoplexy, with all the symptoms characteristic of Ménière's disease, vertigo and deafness. We see the same connection in the brain, in hallucinations of smell and taste, illusions and delusions, from slight erraticisms in mental action

to complete perversion of the mental faculties, as in climacteric mania, and in the nervous system generally, in such evidences of instability as aggravated hysteria, neuralgia, hystero-epilepsy, and epilepsy. In the skin these manifestations are shown in such nerve disturbances as prurigo and herpes, or in the appearance of acne or eczema. The occurrence of nervous alopecia, and the aggravation periodically of any chronic disorder—as, for instance, psoriasis and erythematous lupus—are not infrequent results of menstrual disorders. I have already referred to menstrual ulcer and pigmentary changes. In the heart, irritability in action and hæmic murmurs—conditions which frequently lead to a permanent hypertrophic state, or are felt through attacks of syncope, with evidences of low vascular tension generally, as shown by an habitually compressible pulse—are common.

We find in the stomach gastric irritation, with possible congestive changes which may lead up to gastric ulcer. There are atonic states of the bowel which tend to constipation on the one hand, or on the other to diarrhœa, while disordered sexual function and perimetric inflammation frequently lead to congested conditions of the rectum, complicate hæmorrhoids, and are apt to produce that irritability of the sphincters so conducive to costiveness.

The important bearing of uterine affections on diseases of the rectum, and on operative interference for these, in preventing, as long as they are unrelieved, a successful issue from the latter, is well known to anyone who has had experience in rectal affections. Hence, in a great number of cases, the necessity imposed of delaying operation until the uterine affection has been rectified.

Apart from these more direct consequences of pelvic visceral disease, there are those indirect results that follow upon interference generally with metabolic changes in the various viscera, consequent upon abnormal states of the circulatory fluid, and in which defective ovarian or uterine functions react on such states as anæmia and chloræmia, thus altering the normal

secreting functions of such organs as the liver and kidneys, and seriously interfering with the metabolic action of the spleen.

Whether such conditions are primary or secondary to the general state of health, dependent upon these interruptions, matters little to us as practical physicians. So long as we recognise the physiological game of battledore and shuttlecock they play in deteriorating the general state of health in the individual, we are bound to recognise and treat them.

It is cruel to a woman to style her 'neurotic,' 'hysterical,' or 'hypochondriacal,' while she suffers from any disease of her pelvic viscera, which does thus accentuate or aggravate the ordinary consequences that attend upon any abnormal constitutional condition. It is something more than injustice to her if we deliberately and complacently ignore the influence that such local disease exerts in exciting morbid impulses in her central nervous system. This danger is none the less because temperament in a woman plays so prominent a part in the predisposition to disease and the susceptibility to pain. We must be careful, however, to keep quite distinct the neurosis associated with disease, from that which is the outcome of temperament, disposition, and habits.

The Neurotic Temperament. — In a paper already referred to, I thus describe two forms of temperament of special interest to the gynæcologist: 'I must ask your attention for a few minutes to that large class of sufferers from affections of the female generative organs which is commonly spoken of as "nervous." The neurotic woman, I take it, is to be regarded in the light of a by-product of that unstable nervous organization which we style the "nervous temperament," and it were well to confine our employment of this term "neurotic" to such abnormal and morbid exaggerations of this temperament as are not uncommonly found associated with pathological conditions of the woman's pelvic viscera. Thus, we can frequently trace the incipiency of the neurosis to the occurrence of some accident or injury, which may have had a dual consequence through the infliction of shock, or the inducement of some displacement or affection of any one of these organs. Previous to such accidental determinations, the woman may have been normal in the control of her will, feelings, and emotions. Her energy and impulses have directed her actions, without causing that sense of reaction and fatigue which is so constantly present after slight exertion when her impulses are diverted by unhealthy excitations, and her energy is dissipated by morbid introspections. Such a nervous temperament is frequently satisfied with little

sleep. Under the influence of excitement, fatigue is quickly recovered from, and a latent reserve force of energy appears ever ready on demand to carry its possessor over insurmountable obstacles. All this accumulated governmental control of will and nerve energy are missing in the neurotic, but none the less is that loss felt when the unequal struggle occurs between the sovereignty of an enfeebled indeterminate will, and the rebellious and more masterful emissaries, the woman's "lower passions and lower pains." While in health, such individuals can pass through great physical and mental exertion without stimulants, but when the natural call on their reserve energy finds no response, they apply the artificial spur of alcohol or some other excitant, as morphia, to the flagging nerve-cells. Such women are quite cognizant of the abeyance of the power to exercise free will. The desire to suppress the expression of pain is present, but the usual control is lost. Also, there is general hyperæsthesia of the peripheral nerves, which find in the frequently ill-nourished central cells a susceptibility to slight impulses and morbid sensitiveness, with an exaggerated perception of comparatively trifling stimulation. Here we are dealing with an acquired neurosis, for which possibly we may find no clue through atavistic transmission. On the other hand, we can frequently see in early childhood the traits of temperament which clearly foretell the future neurotic woman. Capriciousness, irritability, selfishness, restlessness and excitability, are among the mental characteristics which stamp the moral prototype in the child of the adult neurasthenic and hysterical woman, though it is after puberty that we frequently find such distinctive features of character develop themselves. When a woman of this type marries, in the demands on her nervous system, if she be not sterile, which the claims of children and domestic duties involve her in, she generally escapes those neurotic and hysterical manifestations that are found in the unmarried and sterile. In the single woman of the "neurotic" type, we are most likely to meet with those erotic thoughts, desires, and practices that still further enervate her nervous system and enfeeble her central control.

'Turn we now for a moment to the lymphatic antithesis of this unfortunate victim to morbid nervous and sexual impulses.

'There is a type of woman, familiar to us all, indolent, lethargic, fanciful of ailments, with a superficiality bordering on childishness in conversation, dull of comprehension, readily open to flattery, even to her own self a bore, and frequently one to her husband and children if she be married. She is often found fringed with layers of pectoral and abdominal fat, the easy prey to quack systems of dieting, and to the "man of the world" physician. Her defective metabolism, added to a sexual voluptuousness, makes this proprietary article the registered dual property of the "pure specialist" for gout on the one hand, and the cotton-wool gynæcologist on the other. She is one of the principal sources of revenue to the new Franc Tireurs of the outposts of medicine—the ubiquitous masseurs or masseuses—as the previously described sufferer is to the fashionable "Weir Mitchell Home." With her, every twinge is "agonizing," to walk is impossible, and once let her evolve "uterus and ovary on the brain," and, whether these organs be diseased or not, they are made responsible for every ill her peccant flesh is heir to. She is not of the classical neurotic type previously described, though her visceral neuroses may in time come to be legion. She may suffer from congestive dysmenorrhœa and ovaralgia, her uterus may be as flabby as her brain, and her ovary be as fertile in aches as her

imagination is in fanciful allusions. Her voluptuosity is not limited to her appetites of palate, and it is not infrequently manifested in various sexual abuses. She fancies she sleeps for many hours less than she actually does sleep, and hence is often seeking for some new, when she has already exhausted every conceivable variety of reputed, hypnotic. While we find in the unmarried more frequently examples of the first type of temperament, married women furnish a larger proportion of the latter.'

I have tabulated 270 cases of disease and abnormal conditions of the sexual organs in women, selecting those cases in which no special functional or organic troubles in any other organ were more particularly complained of, from a total of some 500, the notes of which I have perused. I here give a brief analysis of the associated mischiefs which, I believe, in the vast majority of the cases quoted, were secondary to the affections of the sexual organs. I have not included cases in which there were grosser changes, such as large fibroids and ovarian cystoma. The comparative ages of these patients is roughly shown in this table :

Under 20	7
20—30	90
30—40	102
40–50	63
50—53	8
	270

195 married ; 75 single.

It is sufficient for my object to cite what I consider to have been the principal abnormal state present in each case :

	Cases.
Retroversion, with or without flexion	55
Marked anteversion, with flexion	11
Ovarian enlargement, with or without tubal affection ...	23
Retroversion, with ovarian and tubal complications ...	11
Subinvolution of uterus	33
Erosion of cervix, with or without endocervicitis	22
Hypertrophic condition of uterus	6
Hypertrophic condition of uterus, with ovarian complications	9
Endometritis, with and without ovarian complications ...	14
Extensive laceration of cervix	6
Stenosis, with congenital malformation	15
Small fibroid tumours	11
Intra-uterine polypus	2

	Cases.
Sarcoma of uterus	1
Symptoms incidental to menopause	29
As direct sequel to pregnancy	1
Suppression of catamenia	18
Vaginismus	1
Absent perinæum	2
Total	270

Of the entire number quoted, fourteen were not submitted to local examination, and are included under the head of 'Suppression of catamenia.'

We turn now to the symptoms other than uterine or ovarian complained of in the 270 cases.

I have included no case of malignant disease save one of sarcoma.

The following is a list of the principal signs and symptoms complained of by the 270 patients :

	Cases.
Anæmia	19
*Skin affections (as eczema, erythema, acne, erythematous lupus, alopecia, psoriasis, prurigo)	13
Head symptoms (as aggravated headache, 'fulness in the head,' loss of memory)	53
*Facial neuralgia	15
Neurasthenia	45
Migraine	16
Mammary sympathies (as neuralgic pains, glandular changes)	6
Spinal pain and irritation	10
Intercostal neuralgia	25
Numbness of upper extremities	4
Numbness of lower extremities	4
Pain in upper extremities	2
Pain in lower extremities	9
Stiffness in ankles with each period	1
Catalepsy	2
Hysteria	13
Insomnia	15
Epilepsy	3
Tendency to melancholia, depression	9
Dementia	4
Agorophobia	1
Ophthalmic symptoms dependent upon abnormal retinal	

* See pp. 143, 144.

	Cases.
states (as optic neuritis, pathological changes in papilla, hyperæmia of retina, asthenopia)	15
Nasal symptoms due to turbinate congestion or hypertrophy	5
Laryngeal symptoms, such as varying degrees of aphonia due to paresis of laryngeal muscles, hyperæmia of vocal cords	12
Œsophageal spasm	1
Thyroid enlargement	1
Tinnitus aurium...	7
Sickness and nausea	5
Gastralgia	15
Dyspepsia	11
Cardiac symptoms (as irregularity of rhythm, intermission, dyspnœa, hæmic bruit)	33
Attacks simulating angina pectoris	1
Abdominal symptoms (as erratic pains, flatus, hepatic engorgement, dysenteric symptoms, diarrhœa)	17
Aggravated constipation	11
Pain and irritability of rectum	4
Vesical symptoms (as irritation, difficulty of retention or pain with micturition, vesical pain)...	30
Difficulty of locomotion	24
Impairment of general health	54
Painful sitting	1
Epistaxis	2
Defective circulation—lividity of upper and lower extremities	2

Space does not allow of any exhaustive reference to, nor any special selection of, the cases here referred to. Under the heading of 'aggravated headache' should be frequently included some such symptoms as those described as 'fulness in head,' 'pressure on head,' 'sense of tightness.' and 'flushings.' Under that of neurasthenia I include those well-known unstable states of the nervous system generally, which embrace various morbid apprehensions, fits of depression, uncertainties of sight and touch, disturbance of sleep, irritability or capriciousness of temper.

Under 'difficulty of locomotion' I have only reckoned those cases in which there was a distinct inability to walk.

By 'impairment of general health' I refer to such general conditions as 'lassitude,' 'feeble circulation,' 'weak cardiac action,' 'alteration in the specific gravity of urine,' 'tendency

to syncope,' 'loss of appetite,' and proofs in the complexion and facial expression of great enfeeblement of the system.

I have thus endeavoured to produce some of the evidence which has convinced me of the fact that many distant lesions and remote symptoms are due to, and have their exciting cause in, uterine irritation.

Were I to go back over an equal number of cases of affections peculiar to the ear, the eye, and the nose, I should find that lesions in these organs were occasionally associated with abnormal uterine conditions. I cite these three organs of special sense, as I have accumulated a larger experience of the causes leading up to their ill-health than has been possible for me in the instances of other organs.

The throat and skin have likewise their reflex relationships with the organs of generation in women. The slight elevation of temperature in the skin during the catamenial period is a physiological fact worth remembering.*

The alternating and dominating influence exerted by body and mind over each other in maintaining or disturbing that healthful harmony essential to the preservation of a normal balance of power betwixt the two, is, in my opinion, nowhere better exhibited in the organism than by the effects produced in the nervous system of a woman by the ordinary physiological variations in the health of her sexual organs. How far that harmony is influenced by functional or pathological deviations from a healthy state of these organs, is, I think, shown clearly by the list of nervous affections I have just cited.

* See pp. 143, 144.

CHAPTER XIV.

INFLAMMATION OF THE UTERINE TISSUES—ACUTE AND CHRONIC.

Hyperæmia (Active and Passive).

Acute—Metritis and Endometritis (Cervical and Corporeal).
Septic Gonorrhœa.

Chronic—(*a*) Endometritis (Cervical and Corporeal).
(*b*) Chronic Hyperplasia (syn. Chronic Parenchymatous Metritis).
(*c*) Subinvolution.
(*d*) Catarrhal Inflammation of Cervix.
(*e*) Granular Degeneration of Cervix.

This is a simple clinical classification, and by no means exact. It appears to me the best that can, for clinical purposes, be placed before the student. The pathological sources of metritis have to be remembered, and these are mentioned incidentally in treating of the causation of the various acute and chronic forms of inflammation of the cervical and corporeal canal. We find such primary causes of metritis in—

(1) *Puerperal septic processes*, initiated by pathogenic organisms (pyogenes and saprophytes); chronic mucopurulent discharges associated with similar germs (streptococcus and staphylococcus); traumatic inflammatory processes which follow on wounds of the cervix, lacerations, etc.

(2) *Gonorrhœal inflammation*, caused by the contact of gonorrhœal virus (gonococcus); merismopedia gonorrhœa.

(3) *Tubercular inflammation*, rare in the uterus and Fallopian tubes; tubercle bacillus (evidences of tubercle elsewhere in

the body; absence of menstruation; histological proof of the presence of the bacillus).

(4) *Syphilis and syphilitic* new growths or secondary deposits, and degeneration in the parenchyma or mucous membrane.

Micro-organisms in the Endometrium.

Ernest Laplace, Philadelphia, has published the results of a series of most important experiments in Koch's laboratory. 'These experiments proved that in the normal endometrium numerous organisms were present, which do not want any air, inasmuch as they are quite on the surface. In endocervicitis the *Streptococcus, Pyogencus aureus, albus*, and *citrous*, with *bacillus pyocyaneus*, were found.

'Three cases of women having gonorrhœa were examined. The same quantity of secretion was examined. Plates developed 200 to 300 colonies, but no gonococci, as they do not develop on gelatine. Microscopically, the secretions contained large numbers of micrococci and gonococci. Scrapings from the uterus showed the presence of the gonococcus throughout the degenerating epithelial cells.

'The results of the experiments proved:

'1. The normal endometrium of uterus and cervix is a harbour for vast numbers of micro-organisms, most of which are known to us, but some still unknown, and possessing poisonous qualities for guinea-pigs.

'2. The inflamed endometrium contains the same kinds of micro-organisms, but in vaster quantities, the superficial exfoliating cells also containing them.

'3. In chronic endometritis the secretions contain about as many infectious organisms, the mucous membrane and fibrous tissue become greatly hypertrophied under the continued development of these organisms, and whether this chronic condition be simple or gonorrhœal, we find the germs both in the epithelium and fibrous tissue.

'It now becomes necessary to explain how these organisms get to the deeper parts, and how far their relations as a *cause* of the inflammation extend.

'It is plain that the mere presence of the micro-organisms does not suffice to constitute disease. Disease is the reaction upon the system—local or general, or both—resulting from the *developing* organism. In the uterus the normal secretions are a *poor* culture medium for germ life, and at the same time keep the micro-organisms at a distance from the bloodvessels. If given the proper opportunity, however, if furnished with blood or serum retained any undue length of time within the uterine cavity, micro-organisms develop therein with as remarkable rapidity as they do upon artificial culture media in the laboratory. Now the conditions will have changed, and enormous hordes of bacteria soon develop from those already present, and infect the tissues. Judging from the reaction of tissues under the influence of developing bacteria elsewhere, we should say that cold is, perhaps, the most frequent cause of the initial process; the congestion which soon follows the action of cold upon the tissues being familiar to us all. Next follows the exudation of serum, which is soon contaminated by the bacteria in the neighbourhood; these finding their most favourable soil develop rapidly, producing a chemical irritant or ptomaine which is the decomposition of the serum incident to their growth; this acts as

a direct chemical irritant which keeps up indefinitely the irritated condition of congestion, and hence hypernutrition of superficial cells, proliferation of cells resulting, which cells naturally find their protoplasm inoculated from the first with the bacteria under whose impulse they developed.

'In the chronic form, with hyperplasia of fibrous tissue, there seems no explanation save that the original infection took place as above described, and that, either from neglect or other causes, the parts have become so irritated that the deeper fibrous tissue, under constant congestion, became infiltrated with white blood corpuscles by diapedesis, which gradually built new fibrous tissue, dovetailing with that already existing.

'Simply from a histological and pathological standpoint, inasmuch as the foundation of treatment in disease is the removal of the cause, finding that these micro-organisms exist nearly always to a certain depth, curetting is the rational treatment—removal of all the diseased cells through which we could not expect an antiseptic to act. Thorough scraping being done, it but remains to so sterilize the regenerating mucous membrane as to leave it uncontaminated. Here the acid sublimate solution finds a happy application in the strength of 1 in 2000 to 1 in 5000. At the end of a few days the uterus replenishes itself with a new mucous surface.'—*American Journal of Medical Science*, October, 1892.

HYPERÆMIA.—The vascular system of the uterus is subject to considerable fluctuations in its blood-supply. This we would expect, not alone from its anatomical peculiarities in the distribution of the uterine vessels and the erectile muscular tissue which surrounds them, but also from the influences to which the uterus is subject periodically: such as menstruation, coitus, ovarian excitement, morbid growths, displacements, peri-uterine inflammations. Nor can we ignore, in the uterus as elsewhere, the influence exerted on the arteries by reflex stimuli. Hardly otherwise can we account for inflammatory mischief arising from some slight exposure to cold, or, in some instances, from the careful passage of the uterine sound and the uterine disturbance which follows mental shock.

Symptoms and Physical Signs.—Such sensitiveness and tenderness are present in these cases as we might anticipate would be from a slightly swollen and turgid womb. Perhaps there is an exaggeration of the natural secretion, and a tendency to excessive menstrual flux, or some occasional irregularity of the periods, and metrorrhagia. On examination we may detect a congenital defect, predisposing to stenosis and dysmenorrhœa, or a uterine displacement, or small fibroid. The patient complains of pain in the back, and about the pelvis, and inability

to walk much or to stand. Very often the sufferers are women who have to stand a great deal, or are occupied in some sedentary work. They may suffer at the same time from dyspeptic symptoms. Possibly we discover cardiac or renal mischief, functional cardiac murmurs, and find the urine of low specific gravity.

Treatment.—Under this head I include general hygienic measures; such rest as can be obtained; avoidance of coitus; change of air; the warm vaginal douche; local depletion; the use of Kreuznach and Kissingen waters; the water and baths of Kreuznach and Woodhall Spa, in Lincolnshire; the bromides of potassium and ammonia; the combination, already recommended, of ergotine, quinine, and lupuline; the glycerine tampon, worn at night, or an ichthyol and glycerine tampon (5 per cent.); and the extract of hydrastis canadensis, both given internally and applied as a tampon. Iodine baths are of service, taken with a bath speculum. The bowels are regulated by proper aperients, the saline waters, and occasional enemata.

Passive Hyperæmia.—If we do not see the case in the earlier stage of hyperæmia, there is very often a protracted history, and the general health has been for some time affected. The causes enumerated in bringing about active hyperæmia continue in operation. It is this condition of uterus which, when persistent, leads to general hypertrophy of the uterine tissues, and even to chronic hyperplasia. The same indications for treatment exist as in the active state. We must endeavour to correct any general or constitutional fault, while we control local congestion and subdue irritation.

Acute Metritis and Endometritis.—For clinical purposes we may define this state as that of acute inflammation of the uterine parenchyma and the mucous membrane of the uterine canal. While we cannot separate pathologically the inflammation which attacks the muscular tissue of the uterus and its peritoneal covering from that which involves its mucous membrane, both being very generally associated and intercurrent, still, this division into acute and chronic metritis and

endometritis is an old practical distinction, which for clinical purposes it is as well to preserve. Most frequently the inflammation commences in the endometrium, and spreads to the muscular structure and cellular elements. On the other hand, the attack may begin in the peri-uterine cellular tissue, or the abdominal or uterine peritoneum. In such a manual as this it is better to take these associated conditions together, and discuss them at the same time.

Causation.—This will be traced to wounds; injury; any shocks transmitted to the uterus; operations; cold caught during a menstrual period; gonorrhœal infection; septic infection; intra-uterine medication; the use of stem-pessaries or the uterine sound; vaginitis.

Symptoms and Physical Signs.—Rigors; high temperature; pain and tenderness in the hypogastric region; sense of fulness in the vagina, accompanied by heat and sensitiveness; absence of the vaginal secretion; viscid discharge from the uterus, changing to purulent—this discharge is at times acrid and irritating to the skin of the vulva. On digital examination the uterus is found enlarged and very sensitive; the lips of the os uteri have a tendency to gape. With the speculum the os appears swollen and œdematous; a characteristic transparent and most tenacious mucous discharge fills or at times hangs in shreds from it.

Septic metritis—in its marked preliminary pyrexial symptoms, the great pain, the accompanying peritoneal mischief, and the history of a definite cause, as a recent operation, injury, or septic contagion—is not likely, with the exercise of care, to be confounded with any other affection. The approach of pelvic or general peritonitis is marked by varying degrees of immobility of the uterus, abdominal tenderness, and tympanites. I may say that I do not believe in any such affection as uncomplicated metritis. I have never seen a case of metritis run its course without some degree of pelvic peritonitis, perimetritis, salpingitis, or endometritis accompanying it.

Diagnosis.—If with the foregoing symptoms we find, on

digital examination and the bimanual method, that the uterus is enlarged and sensitive, while the vagina is hot or swollen, we can have no doubt of the nature of the affection.

Prognosis. — This must always be cautiously expressed. Should the inflammation end in abscess, peritonitis, or septicæmia, the issue may prove rapidly fatal. On the other hand, if the inflammation should remain localized, and yield to active treatment, it may terminate in a few days, or it may pass into a chronic form, leaving the patient with an enlarged (parenchymatous) uterus and chronic endometritis.

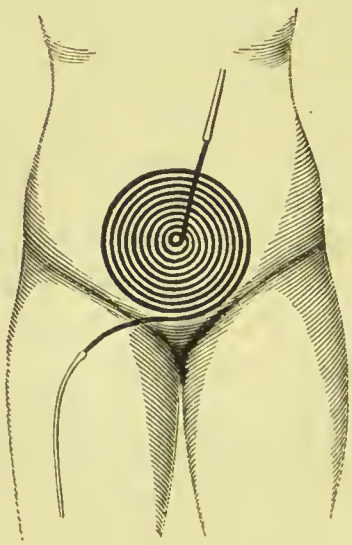


FIG. 237.—Leiter's Temperature Coil.

It is well-nigh impossible to diagnose a metritic abscess. It is hardly necessary to insist on the danger of using the uterine sound in any case of acute inflammation of the uterus or its peritoneal connections.

Treatment.—In acute septic metritis, leeches may be applied (eight to twelve) over the hypogastric region, close to the pubes; warm compresses should be used, and spongiopiline, sprinkled with laudanum and belladonna, applied over the uterus. A thin linseed poultice, covered with oiled silk, or a mild turpentine application, mixed with laudanum, is laid over the lower part of the abdomen, if there be tympanites. An

ointment composed of oleate of mercury and morphia (5 per cent.) with extract of belladonna, spread on a piece of linen, and laid on the abdomen, under the moist compress or spongiopiline, will be found of use. A Leiter's temperature-regulator may be worn over the pubes (Fig. 237). Aveling's coil of the same tubing, fitting into a cup and stem, and which can be worn in the vagina, is an ingenious application of Leiter's plan. The medicines we rely on are opium, half-grain to one-grain doses every third or fourth hour; quinine, in doses of three grains every third hour, either alone or combined with the opium. If there be high temperature, then a few doses of ten to twenty grains generally reduce it, if the patient can tolerate these, or Warburg's tincture. Ten grains of phenacetin or antipyrin can be tried for elevation of temperature, and be repeated as the temperature indicates. The patient must be fed on liquid nourishment, such as milk, chicken-broth, and beef-tea. Alcohol should be administered at intervals according to the patient's strength, and its effects on the pulse and tongue watched. In the meantime, the vagina is washed out at intervals with a warm douche of perchloride of mercury solution (1 in 5,000) at a temperature of 100° to 110°. Such authorities as Walton, Doléris, Gottschalk, Petit, and most of the American authorities, advocate dilatation, curettage, and drainage in metritis. By these steps the uterine isthmus is enlarged and freed from obstruction, the flow between the Fallopian tube and uterus is increased, muscular contractility in the tube and uterus is excited, congestion of the pelvic organs is lessened, and local sterilization of the uterine cavity by antisepsis is permitted.*

Taking 'The System of Gynæcology,' edited by Baldy, as the representative expression of opinion of American gynæcologists, we find the operation enthusiastically advocated in the presence of acute tubal and peritoneal manifestations. The arrest of septic dissemination and absorption are secured. The safety of future operative procedures on the annexa is increased.

* See pp. 132-137 for the Operation and Dangers of Curettage.

'A primary cœliotomy when curettage is indicated in a case of acute salpingitis and peritonitis,' says the writer in the work we have referred to, 'stamps a man as blind to reason and to the work of other men, and as willing to open a fellow-being's abdomen rashly and unnecessarily.' The practice of the gynæcology of to-day, in all cases of septic peritonitis, puerperal and other, is tending more and more to discountenance the old methods of inaction, and to encourage the plan of timely local treatment of the source of the infection in the uterine endometrium by curettage. It is now clearly established that the endometrium, after an aseptic curettage, is reproduced in its entirety within a period of from eight to ten weeks.

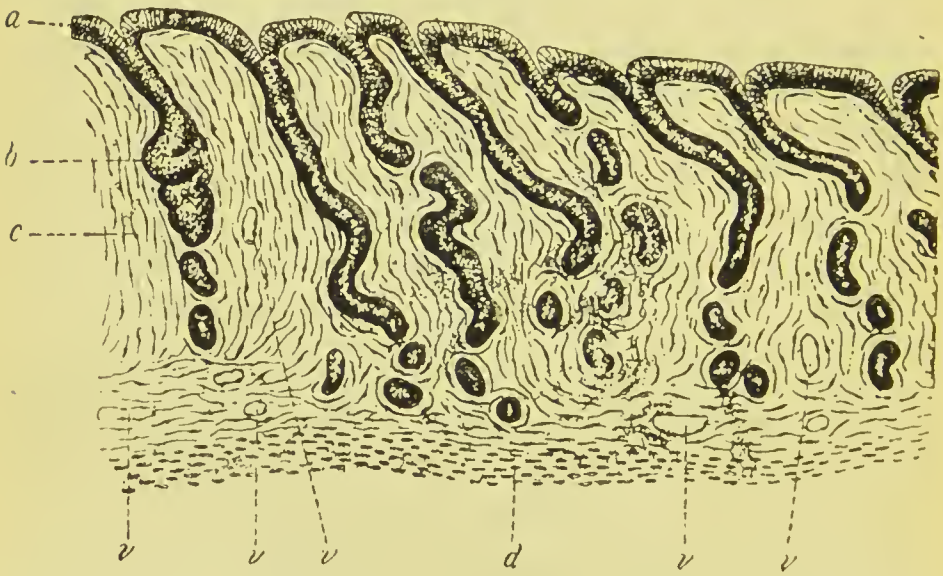


FIG. 238.—Vertical Section of the Uterus three Months after Curettage: *a*, epithelium ; *b*, new-formed glands ; *c*, connective tissue ; *d*, muscular tissue ; *vv*, blood-vessels (Baldy).

The contrast between the normal appearance of the mucosa after the curette, and after the employment of caustics, is marked. In the latter case, there is an atrophic condition, with absence of the glands and excess of the connective tissue. In all cases of acute uterine inflammation, the administration, in the early stages, of a saline is of service. Liquor ammoniæ acetatis, with sweet spirits of nitre ; bicarbonate and citrate of potash ; the saline mixture of sulphate of magnesia in infusion

of roses, are perhaps the simplest and most useful. If the bowel be costive and the tongue coated, the administration of a few grains of calomel at bedtime, followed by a saline aperient in the morning, will benefit.

If the metritis should supervene on operative treatment, or be the result of septic infection or gonorrhœa, the cervix should be dilated (if not already), and the dull curette used, and the prudence of washing out the uterine cavity must be considered.

Chronic Metritis.—The student must distinguish between the condition known as 'chronic metritis' and the acute metritis which we have just considered. This state is rarely, as that term would lead him to suppose, the consequence of any acute inflammatory change in the uterine tissues. It is not, or at any rate very rarely is, an *arrested* resolution, as in other inflammatory processes of a chronic character. This remark applies more especially to that form of chronic metritis in which the parenchyma of the uterus is the part principally affected. When the acute inflammation of the mucous membrane has subsided, we find that a chronic state of congestion occasionally remains, which becomes aggravated in time. The metritic changes that accompany this chronic catarrhal discharge from the endometrium have risen independently of any acute inflammatory process in the parenchyma. It is this hyperplastic change that we have to consider in chronic metritis. At the same time, we cannot, as Schroeder insists, separate from chronic metritis the idea of congestion, swelling, and pain; and consequently the clinical value of the term remains unchanged.*

Chronic Endometritis.—The division of endometritis into cervical and corporeal is of considerable clinical importance, and the old term of 'endocervicitis' still retains its clinical significance.

Pathology.—Inflammation of the cervical mucous membrane and the glands of Naboth; hypersecretion of cervical mucus, alkaline in character; enlargement and elevation of the papillæ,

* See Chapter on Tuberculosis of the Uterus.

which have the appearance of granulations, so that the cervix assumes a granular appearance (these granulations bleed readily); abrasion of the epithelium—are the local signs. This latter condition is often erroneously spoken of in practice as 'ulceration.' It is perhaps the most frequently met with of all uterine inflammations.

Some important observations have been made within the last few years on the pathology of chronic metritis, a summary of which we take from the valuable work of Stephan Bonnet and Paul Petit.*

In that form of cervical endometritis characterized by a profuse secretion, the villosities of the mucous rugæ are exaggerated, and sometimes glandular cysts form projections on the surface of considerable size. The more superficial epithelial cells are elongated, or in a state of transformation. The glands are more numerous and scattered, or are in part obliterated by the formation of cysts. Much more frequently then in corporeal endometritis they are found in the muscular wall in a flattened condition. There is proliferation of the gland-cells, their nuclei being displaced, the cells altered in shape, much elongated, or, on the contrary, flattened and shrivelled, according as the mucous contents are retained or not. Around the glands and the vessels there is an increase of the normal cells, and an infiltration of round cells. The hyperplasia of the glands may give rise to hypertrophy of the neck, without any involvement of the stroma. Under the head of external cervicitis are included those inflammatory lesions which are seen on the external surface, and which are in pathological and anatomical continuity with internal cervicitis, not with vaginitis. The intra-cervical muco-purulent flow is frequently found on the external surface of the os, or inside or between the lips, the moist patches, of a vivid red, being accurately marked off from the remainder of the vaginal portion. Occasionally these red patches, by their undulating folds, recall the appearance of the intracervical mucous membrane. They are

* 'Traité Pratique de Gynæcologie'; Ballière et Fils, Paris, 1894.

the catarrhal surfaces of Hart and Barbour. At times they have an eroded look. Their surfaces may be almost smooth, granular, papillary, or villous. With regard to the question of a true ulceration occurring in the neighbourhood of the lips of the os, Fischel, Doederlein, and others, have established that there is a loss of substance which exposes the cellular tissue. These true ulcerations, however, are very few in number, and are mingled with pseudo-ulcerative spots, which, as well as the ordinary papillæ, are covered by cylindrical epithelium. They may be thickened, or possibly effaced, by glands—cystic or otherwise—which are analogous to the intracervical glands, and in a case recorded by Cornil they were of a true sebaceous character. But it is a question whether this partial pseudo-ulceration is not to be regarded as an erosion, an ectropion of the cervical lips, or a congenital anomaly. The fact that glandular cul-de-sacs have been found beneath the pseudo-ulceration, at a distance from the os, and under the stratified pavement-lining which surrounds it, is advanced against the theory that the erosion is limited to the superficial layers of the epithelial pavement (Ruge and Veit, Fischel, Landau, Abel, Cornil).

The oblique direction in which the glands are found has been advanced as an argument on the other side. Ruge and Veit think that these are glandular neo-formations; but Cushing, Bonnet, and Petit, question if they have not mistaken the appearance of incipient epithelioma for them.

The papillary or granular condition is found equally in the pavement epithelium and the cylindrical, which pass insensibly the one into the other in this situation, and give to it that papillary appearance which is so characteristic. Bonnet and Petit view the theory of ectropion of the endocervical mucous membrane, complicated by inflammation, as fitting in with most of the pathological facts. The ectropion is accompanied by more or less eversion of the subjacent muscular wall. The general physical appearances of such eversion are readily recognised.

Fischel has made an examination of the uterus of twenty-eight infants, and found that in ten cases the vaginal surface around the external orifice was covered for a certain extent with cylindrical epithelium, and not with the pavement form, the usual situation of the line of junction between the two being thus lost. This constitutes what has been called a *congenital physiological ectropion.*

The cylindrical cells may be interspersed between islets of flat cells, or arranged in clusters analogous to those of the intracervical glands.

Bonnet and Petit conclude 'that from the histological point of view the pseudo-ulceration may be simply an ectropion of the intracervical mucous membrane, attended by superficial inflammation, associated possibly at the time with epithelial and dermal complications and eversion of the cervical lips. It may be an erosion of the pavement lining of the vaginal surface of the uterine neck, which can be increased by the presence of abnormal glands of congenital origin. A congenital anomaly through a defect in the transformation of Muller's epithelium 'is another cause of this condition.' They think that true ulceration is always of a partial character, occurring over the false form, and is of the same nature as a follicular erosion, which results from the bursting of Naboth's follicles.

Diagnosis will depend more or less upon the presence of the enlarged follicles, and the character of the epithelium which covers the abraded part, whether that ectropion or eversion be of a traumatic, inflammatory, or congenital origin. The obliteration of the papillæ through swelling of the mucous membrane accounts for the smooth appearance of the pseudo-ulcerations. The papillary, granular, or villous aspect may be due to an incomplete abrasion, or at certain points to a more extensive destruction of the papillæ on the vaginal surface.

Hypertrophic Endometritis.

With reference to corporeal endometritis, the above-quoted authors consider that *hypertrophic endometritis* has in its nature two factors, the one of an inflammatory, the other of a trophic origin. They divide corporeal endometritis

into two forms: (1) that with hypertrophy of the mucous membrane, (2) that with atrophy of the same. In the former they describe a considerable increase of the endometrium, at the same time that it loses its normal firmness and is more easily detached, while its surface is broken up into elevations and depressions, due to alterations in its glandular structure, or possibly to true vegetations which in the course of time become polypi. But the glandular degenerations or hyperplastic changes are more manifest and persistent in some cases, with the tendency to a natural transformation into the epitheliomatous type.

These glandular changes are in part due to a hypertrophy or hyperplasia, which has its origin in the cylindrical epithelial lining, part retaining, and part losing, its vibratile cilia (Cornil), the gland-tubes being choked with mucous and migratile cells. Hyaline changes, analogous to those seen in albuminuria, have been noticed by Cornil. In the connective tissue there is swelling of the cells and dilatation of the vessels. In

Interstitial Hyperplasia,

proliferation and hypertrophy of the connective tissue are the principal features, the cells not only swelling and proliferating, but assuming the aspect of true decidual cells, fusiform or giant. Sinéty has described a form of interstitial endometritis in which he discovered embryonic vegetations. A

Hæmorrhagic Form

is described, which is characterized by the number of small vessels seen on the surface of the mucous membrane, and that condition to which we have already referred, in which polypi, whether glandular, muco-fibroid, or vascular, are found, has been denominated 'polypoid.' In these cases, there is a considerable increase in the interstitial tissue.

Atrophic Corporeal Endometritis

includes those lesions which result from interstitial proliferation or the microbal action on the normally degenerated tissues. The interglandular stroma is sclerosed; the corporeal glands are atrophied; the lining epithelium is transformed or disappears; ulcerations occur discharging pus or blood.

Caseous Degeneration

occurs occasionally in the follicles, to which we refer in the text.

Causation (*Predisposing and Exciting*). We may group the causes thus:

1. Predisposing:
   - Constitutional (tubercle, chlorosis).
   - Defective diet.
   - Excessive lactation.
   - Frequent labours and subinvolution.
   - Mental causes.

2. Exciting:

Excessive coition.
Exposure to cold during menstruation.
Gonorrhœa.
Vaginitis.
Displacements.
Stenosis of cervix.
Polypi.
Laceration of cervix.
Abortion, miscarriage, parturition.

Symptoms and Physical Signs.—Pelvic pains and backache, attended by difficulty in walking; leucorrhœa of a viscid character; vaginitis (occasionally); dyspareunia; sterility, from the impediment to the passage of the semen, and the action of the secretion on the spermatozoa; deterioration in the general health.

On examination by the finger and speculum, we often find the os uteri denuded of its epithelium and some surrounding erosion or granular degeneration of the adjacent cervix. Occasionally there is the characteristic viscid discharge blocking up the cervix, which is removed with difficulty. A version or flexion may be detected, and dysmenorrhœa is a not unusual symptom.

Prognosis.—As it is the most frequent, so is it often the most inveterate of uterine states. It is the experience of every surgeon that endometritis, both cervical and corporeal, yields occasionally to no treatment. Or, even when we have succeeded in altering the nature of the secretion, and have finally arrested it, a lull in the treatment is followed by a return of the old complaint in as aggravated a form as before. The longer the affection has lasted, and the more viscid and stringy the discharge, especially in those cases of malformed uterus, the worse is the prognosis.

Treatment (*Local Therapeutic Measures*).—As I have already referred to the methods of applying various substances to the interior of the uterus and the manner of dressing the cervix, I

shall only enumerate briefly the most efficient means of treatment. The first and most important point to decide is, whether the inflammation be localized in the cervix, or involve the fundus. In this we must be guided by the character of the discharge, and the size and sensitiveness of the body of the uterus.

Assuming that the cervix alone is inflamed, our first step should be to secure such dilatation of the cervical canal as will permit of the free flow of any discharge, and also allow room for a topical application to the mucous membrane. This is best done by bilateral incisions, as before described, with a Kuchenmeister's scissors.

The loss of blood consequent upon the incisions will be of service. The passage of a uterine bougie will also secure sufficient dilatation. The uterus must be dressed repeatedly, and the plug of cervical mucus wiped away, either with a small piece of dry sponge fixed on a sponge-holder, or with a little cotton-wool rolled tightly round the point of a rough uterine probe. The hot vaginal douche may be used a few times daily. A little borax, carbonate of soda, boiled starch, Condy's fluid, laudanum, tincture of iodine, liquid extract of hydrastis, may be added to the water. Kreuznach *mütter lauge* or that of Woodhall is an excellent addition (two ounces to the quart). It is well to deplete the cervix a few times. Such therapeutic means as carbolic acid and glycerine, ichthyol and glycerine, extract of hydrastis and glycerine, tincture of iodine and glycerine, chromic acid solution, nitrate of silver, Braxton Hicks' fused zinc crayons, or iodoform, can be used. The nitrate of silver may be applied on a uterine probe, by first fusing a little of the silver salt in a small crucible (Fig. 125) over a spirit-lamp, and then dipping the point of the probe into the cup, so as to get a film of the nitrate of silver on it. But by far the most efficient and perfectly safe agent, when applied with due care, is fuming nitric acid. (See full directions for its application, p. 110.) When applying it merely to the canal of the cervix, it is not necessary to use a

cannula. After making use of any of these agents, a glycerine tampon should be passed into the vagina. Ichthyol solution ten to twenty per cent. is an efficient application in chronic inflammatory states of the cervical endometrium. Its local use may be combined with the internal administration of the keratin-coated capsules of Burroughs and Wellcome. Like

FIG. 239.—Dressing the Cervix with Sims' Speculum and Uterine Probe.

many other vaunted remedies, ichthyol fails in some cases to give any result.

General Treatment.—The patient must abstain from coitus; have such outdoor exercise as common-sense will dictate to be suitable to her strength; sufficient rest in the horizontal position is necessary; much standing is to be avoided. Change of air, proper tepid bathing of the body, simple, yet nutritious, diet, moderation in alcohol, long hours of rest, careful atten-

tion to the secretions, are all important aids towards curing the disease. The most important medicines are arsenic, quinine, hydrastis, viburnum prunifolium, the mineral acids with the vegetable tonics, bark, columba, gentian, nux vomica. If there be nervous excitement and much pain, the bromides are indicated.

Chronic Corporeal Endometritis (*Pathology*, see pp. 315-319).—While it is of the utmost importance to recognise the clinical fact that chronic cervical endometritis *per se* is a frequently occurring affection of the uterus, it must not be thought that endometritis of the body is ordinarily met with apart from the cervical catarrh. On the contrary, every practitioner knows that the corporeal inflammation is generally attended by varying degrees of cervical endometritis. In chronic corporeal endometritis, not only are the utricular glands of the body involved, but so also are those of Naboth in the cervix. The exaggeration of the natural secretion from the utricular glands is the most prominent sign of the affection. From the account of post-mortem examinations (Scanzoni and Thomas), the mucous membrane is found, at the commencement of this disorder, swollen and reddened; later on it is paler and of a gray colour.

The glands, finally, are atrophied, the mucous membrane is deprived of epithelium, and the deeper layers form sprouting granulations, which at times assume the appearance of small polypi.

The cavity of the body is enlarged when the disease lasts for any length of time, and there may be a mere lining of connective tissue, which takes the place of the natural mucous membrane.

Causation.—Those causes which operate in producing the cervical, likewise bring about the corporeal endometritis. I wish, however, to direct special attention to a few uterine affections with which the latter affection is constantly associated, or that it follows:

Subinvolution of the uterus.
Abortion and miscarriage.
Obstructive dysmenorrhœa.
Prolonged lactation.
Flexions.
Gonorrhœa.
Vaginitis.

Symptoms and Physical Signs.—Profuse glairy discharge, at times coloured, and tinged with blood, or purulent and shreddy; amenorrhœa, dysmenorrhœa, or metrorrhagia; sterility; all the symptoms already noted of cervical endometritis in an aggravated form. Frequently there is enlargement of the uterine canal, and increased sensitiveness of the entire uterus, which by bimanual examination is found enlarged.

Treatment.—I have already alluded to various local applications useful in the treatment of this affection. Intra-uterine medication and the different methods of applying absorbent, emollient, stimulant and caustic remedies to the uterine cavity have been referred to. I have also pointed out the special dangers of intra-uterine injections. It is not necessary to discuss these matters a second time. The practitioner will find that any or every form of local treatment will fail in some long-existing cases of endometritis. Of all the agents enumerated, I personally prefer either the fuming nitric acid or chromic acid (ʒi—$\bar{ʒ}$i), applied with the precautions already insisted on. After an interval of rest, if the symptoms continue, a second application may be called for. Let me briefly state what in practice I have found to be the most efficient treatment of corporeal endometritis:

1. General treatment, such as that indicated in cervicitis.
2. Dilatation of the internal os with tents or bougies.
3. Application of nitric acid or chromic acid to the cavity of the fundus.
4. The uterine curette followed by the application of chromic acid, especially if from metrorrhagic discharge there is reason to suspect a granular condition, or fungosities or a polypoid state.

In any obstinate case of chronic endometritis I now at once proceed to curette the cavity, and combine this treatment with drainage and subsequent cleansings.

5. This treatment, alternated with other intra-uterine medication, especially carbolic acid and iodine, ichthyol ten per cent. solution, extract of hydrastis.

6. Depletion of the cervix.

7. The vaginal douche, using with it, occasionally, iodine, borax, carbonate of soda, Kreuznach water (the mother-liquor of the same spa), or that of Woodhall.

8. The persistent use of glycerine with hydrastis and ichthyol tampons.

9. If a displacement exist, rectifying it and adjusting a pessary, when the inflammatory state has been treated for some time.

Galvano-chemical Cauterization.

G. Apostoli, of Paris, treats chronic metritis by means of the galvanic current, beginning with a weak current at first (20 or 30 up to 80 milliampères at the first sitting), and gradually reaching 200 milliampères. Ten minutes is the time allowed for a sitting. The positive pole he recommends to be placed in the uterus in hæmorrhagic and ulcerative states, the negative in other conditions. At all sittings the strength of the current is to be increased gradually, and, if rest in bed cannot be secured, once a week is often enough to operate, otherwise twice weekly. Coitus must not be permitted. Pregnancy is to be first carefully excluded. Any existing or recent perimetritis will contra-indicate the treatment. Apostoli claims for this method :*

1. Its ease of application and harmlessness.
2. The gradual nature of the cauterization, which is always under control.
3. Its chemical as well as caustic action.
4. It may be used either to restrain hæmorrhage or reduce congestion.

Syphilis.

The occasional relation of syphilis to chronic inflammatory states of the endometrium should not be forgotten. I can most strongly recommend the *tannate of mercury* in all secondary or tertiary syphilitic affections. Both it and the percyanide of mercury (as elsewhere advised) are admirable preparations of mercury to administer to women. A pill of

* See chapter on Gynæcological Electro-Therapeutics for full details of this treatment.

Hydrarg. tannatis, gr. ss. to gr. i.
Quinæ sulph., gr. i.
Ext. gentian, q.s.,

to which, if necessary, $\frac{1}{30}$ to $\frac{1}{60}$ of a grain of arsenious acid may be added, will be found a most effectual remedy in chronic or recurrent syphilitic states.

Microscopical Diagnosis of Growths of the Cervix Uteri.

In the face of the difficulty of diagnosis of morbid growths of the uterus by means of the microscope, and the various appearances presented at different periods of life by the normal uterine tissues, it is clear that only experienced experts should venture to decide upon the nature of the tissue examined as to its benign, tubercular or malignant character. Plimmer (*Brit. Gyn. Jour.*, November, 1895) gives the following instructions as regards the immediate treatment of a portion of tissue which has to be submitted to a further examination : A solution of

Sodium chloride, 7·5 gr.
Glacial acetic acid, 10 c.c.
Distilled water, 1 litre.
Mercuric chloride to saturation.

Next wash in running water for two or three hours, and then place in 50 per cent. of alcohol for twenty-four hours. After this, immerse in 90 per cent. of alcohol for twenty-four hours, and finally in absolute alcohol for twenty-four hours. This process is pursued before the portion is passed through cedar-oil into paraffin, or cut with a freezing microtome, or a rocking or paraffin microtome. I give this method of ready preparation of a specimen, as it is one at hand for everyone. With regard to pieces to be examined, he says that it is better, when possible, to cut out a piece or pieces from different parts, which shall include both the mucous membrane and a small portion of the underlying muscular layer, and when the curette is used for diagnosis, the surface of the muscular layer should be included. No one can read the pertinent directions and observations of Plimmer in the paper referred to without realizing how extremely deceptive are many of the appearances seen, not only in normal states of the cervix, but in simple inflammatory affections. Also we realize how vital it is, in the conduct and supervision of any case of cervical disease, whether it be simple hyperplasia, any form of erosion, hypertrophies and polypi, or adenomatous growths, to secure, if possible, careful pathological reports as to the nature of the affected tissues.

I can only repeat here the caution, several times reiterated in this work, that practitioners, in the treatment of all suspicious chronic enlargements of the uterus, should satisfy themselves thoroughly as to the condition of the endometrium by the assistance of dilatation, the dull curette, and the microscope. These aids to diagnosis (as well urged by Smyly) become the more necessary when we have—

Cystic and follicular degeneration of the cervix.
Shreddy discharges from the uterine canal.
Softness and tenderness of the uterine walls.
Any foul-smelling discharge.
A recurring sanious flow.

We may thus histologically detect the presence of tubercle or cancer.

Zinc Chloride Treatment.

The cauterization of the uterine canal with *zinc chloride* as a means of treating chronic enlargement of the uterus has been practised by Rheinstädter, Dumontpallier, Frankell, and others. The zinc (grs. xxx.—℥i. to the ounce) is applied twice in the week. The vagina should be carefully protected, and any of the solution that may touch the vaginal wall should be immediately neutralized with bicarbonate of soda.

The practitioner in using zinc chloride will find it safer to adopt the precaution advised in the application of all powerful intra-uterine medicaments, by securing sufficient patency of the cervical isthmus, avoiding excess of the solution applied, and giving due attention to the time of application as regards the occurrence of the catamenial flow. The value of iodoform, whether alone or combined with curetting, as an intra-uterine dressing and as a vaginal tampon, has been urged by several writers.

SUBINVOLUTION.

As I have always taught students to regard subinvolution of the uterus as a chronic hyperplasia, it is the view which I shall briefly represent here. To comprehend the change in the views of uterine pathologists—from the time when Henry Bennet, whose teachings, now a matter of history, so ably advocated the doctrine of uterine inflammation as a cause of chronic uterine enlargement and other morbid uterine conditions, to the present day—the student must consult the more comprehensive works on gynæcology.

Pathology. — The entire organ is enlarged, its walls are thickened, and its cavity increased in size. The student obtains the best idea of the causes of this increase when he recollects the changes which occur in the tissues—muscular, cellular, lymphatic, and vascular — of the pregnant uterus. After conception all these tissues are enlarged. The period of complete development is arrived at when parturition occurs. After labour there is a process of 'retrograde metamorphosis,' when the uterus, especially during the puerperal month, passes through the series of changes which constitute involution. Absorption of *débris*, fatty degeneration of the muscular tissue, and formation of new elements, are the means by which this change is accomplished and completed, in a period of from

six to eight weeks. Should this katabolic process be arrested from any cause, we have an unabsorbed fatty *débris;* enlarged muscular fibres, with embryonic elements of new tissue; hypertrophied areolar tissue; increased size, both of the blood-vessels and lymphatics. While the muscular elements remain thus stationary, or after a little time commence to atrophy, the connective tissue is increased, and the uterus is arrested in a state of general congestion, with enlarged vessels. According to Finn of St. Petersburg, the hyperplasia of the muscular fibres is an essential part of the process, the augmentation in the connective tissue influencing it but little. The number of muscular fibres is always increased. There is no difficulty in understanding why hyperplastic deposits and rapid development of connective tissue follow. This hyperplasia is the essential pathological condition of the affection. As occurs elsewhere, the connective-tissue growth strangles the vessels, and consecutive atrophy follows. Change in colour and size of the uterus is the result. The last stage is one of contraction and shrinking.

The surgeon is oftentimes meeting cases in which, with cervical endometritis, there is considerable enlargement and subinvolution of the uterus. In unmarried girls we frequently find considerable uterine enlargement, not myomatous, associated with displacement.

We constantly see patients, married and single, in whom the cavity of the uterus is enlarged to the extent of three inches and over, who are nulliparous. Sclerosis of the uterine parenchyma, some version or flexion, and a chronic endocervicitis are present. Thus, chronic congestion—which leads to transudation, hypertrophy, enlargement of the uterus, and hyperplastic change, with cellular tissue formation—may, and frequently does, arise in other ways than as a sequence of pregnancy.

Causation.—Parturition and neglect during the puerperal month; rising from bed, standing, or over-exertion too soon after delivery; puerperal peritonitis, or metritis; laceration of

the cervix; endometritis, corporeal and cervical, and the causes which produce these states; frequent pregnancies; prolonged lactation versions and flexions.

Diagnosis.—By digital examination, if the cervix be involved, we detect a rather open os, which is swollen and painful; a

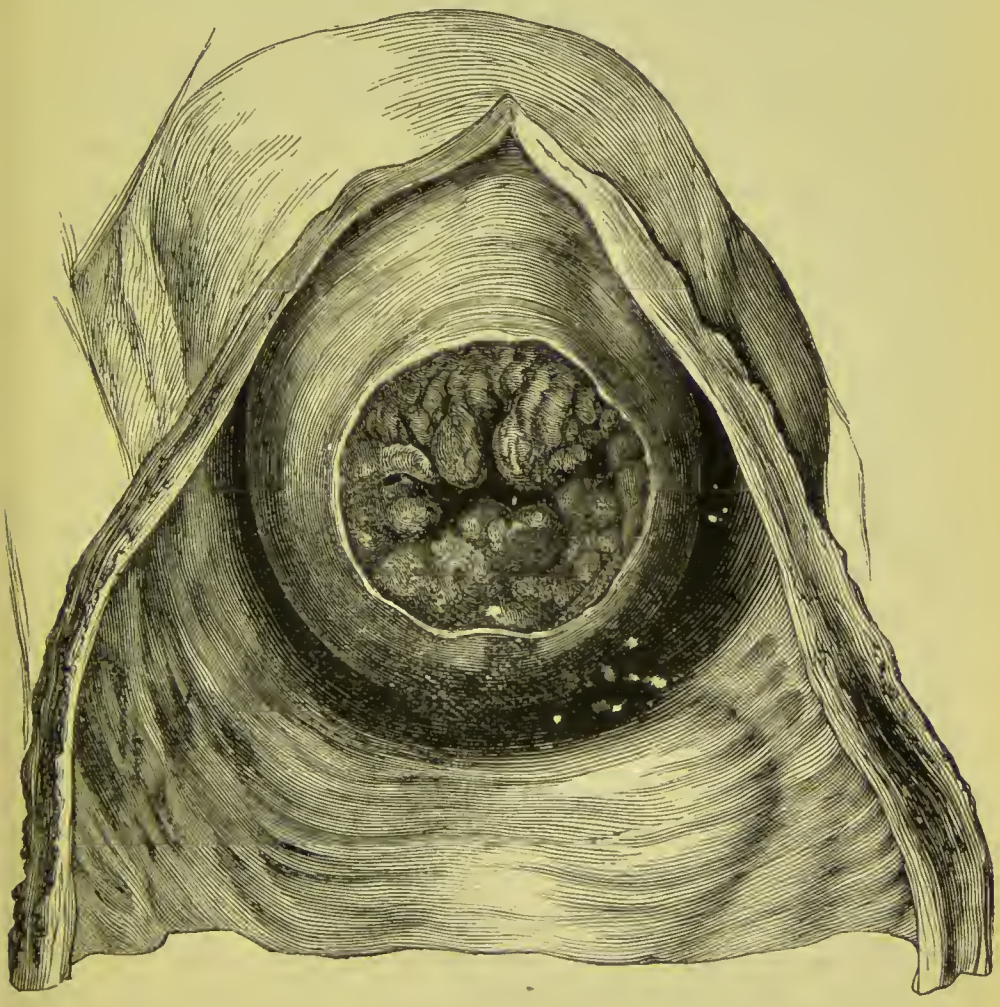


FIG. 240.—Epithelial denudation around the os uteri, showing effects of labour one month after parturition (Robert Barnes).

sensitive, though somewhat hard, cervix, which has descended in the pelvis. The uterus is generally either anteverted or retroverted, more frequently in the former position. By the bimanual examination the body of the uterus is found enlarged, and by careful palpation the fundus is discovered, unless it be

retroverted, above the pubes. The uterine sound passes for the extent of three or three and a half inches. The history of the case, pointing either to an old endometritis, a recent parturition or abortion, or irregularity in the menstrual flow, will confirm the diagnosis. The chance of pregnancy existing must be carefully remembered; and if any doubt exist, it is better to postpone the passage of the uterine sound. There are some *negative signs* it is well to remember in differentiating this affection. The cervix is rarely soft; there is no progressive enlargement of the uterus from month to month; the uterus does not generally enlarge beyond from three and a half to four inches; there is no cachexia; the discharge, if any exist, is not foul-smelling. With these facts in our mind, we are not likely to mistake chronic hyperplasia for either early pregnancy or cancer of the uterus.

Symptoms. — There is scarcely any symptom, either constitutional or local, attendant upon a uterine affection, that a woman afflicted with subinvolution of the womb may not suffer from. To enumerate these would be to recapitulate all the various local and pelvic pains and reflex disturbances which arise from chronic endometritis, enlargement of the womb, or from displacement. The intensity of the symptoms will depend on whether the fundus alone, or the cervix, or both, are enlarged. The more prominent symptoms usually are: difficulty in walking, lumbar and sacral pain, pelvic distress from pressure on the bladder or rectum, nausea, dyspareunia, loss of appetite, and various nervous disorders. If the fundus be the part principally engaged, there is very often menorrhagia or metrorrhagia.

Treatment.—If inflammatory conditions of the endometrium are present, these must be treated in the manner already indicated. The hot vaginal douche is useful. The uterus should at intervals be freely depleted, and a glycerine and ichthyol tampon used.

Vesication.—Gaillard Thomas (after Aran) advises free vesication of the cervix, through a cylindrical speculum which embraces it tightly. Vesicating

collodion is used. The patient rests in bed after its application, and a glycerine pledget is inserted. A discharge of serum occurs within twelve hours. Any laceration of the cervix has to be closed.

Iodine.—In the treatment of both chronic hyperplasia and cervical endometritis, the iodized pledgets of absorbent wool are often of benefit. One of these iodized balls may be dipped in glycerine and applied to the cervix. It is retained in position by a tampon of salicylic acid wool and glycerine.

Hydrastis and Ichthyol.—The free use of hydrastis and ichthyol in tampon and douche is of service. But perhaps the most important portion of the treatment consists in attention to the general health, and in securing judicious rest without unnecessary and prolonged confinement, which often leads to a state of chronic invalidism.

Sexual intercourse must be avoided, or only indulged in at long intervals. Weir Mitchell's rest plan may be tried, in the manner hereafter detailed.* To those who can afford it, a course of waters and baths at Kreuznach, Woodhall Spa, Kissingen, or Ems, may be recommended; Schwalbach, Barrèges, or Spa, if a ferruginous spa is indicated. Royat, with its arsenical and iron water, and Bourboule with its stronger arsenical springs, are among the most valuable arsenical spas in Europe. At all times change of air, temporary residence by the seaside—and no country is so rich in health-giving seacoast resorts as England—will do much to assist the treatment. Where the patient cannot go to the seaside, the seaweed-essence gives an admirable salt-water bath at home.

* See chapter on Massage.

CHAPTER XV.

LACERATION OF THE CERVIX.

This lesion, varying in the number of rents or fissures of the cervix, their depth, and the degree of pouting of the cervical canal, is the consequence of labour. It results most frequently from manual or instrumental interference, and too early rupture of the membranes. In short, it is often, though by no means necessarily, the fruit of 'meddlesome' midwifery and hastily conducted labours. In those rapid labours, in which delivery is precipitated, such rents are apt to occur.

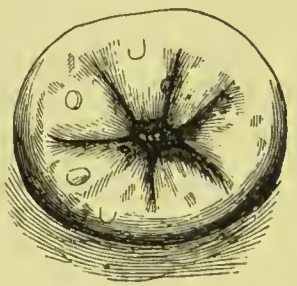


Fig. 241.—Stellate laceration (Emmet).

The rent is generally transverse, for, as Goodell explains, the fissure-line, when lying in this direction, crosses the axis of motion of the uterus, and hence the tendency to separation of the flaps. At other times the fissures are multiple, as in this drawing after Emmet.

According to the same authority, laceration is most frequent on the left side, this being attributed to the position of the child's head in the right oblique diameter, the occiput lying

anteriorly, and to the left. Bell, of Glasgow, in a recent communication read before the Gynæcological Society, drew attention to the correlation existing between laceration of the cervix and tubal affections, remarking that the affected annexa are found on the side of the laceration. This may possibly be so in some cases, but it certainly is an association to which we constantly find exceptions. The percentage of women suffering from uterine disease, who are subject to laceration of the cervix, has been variously estimated by leading American writers at from ten to forty per cent. (Mundé, Ambrose Pallen, Barker, Emmet, Goodell).

That the cervix uteri is more or less torn in a large proportion of labours all will admit. But a large percentage of such rents close spontaneously, and a considerable number cannot be said to cause either ill consequences or any suffering to the woman.

Surgeons must not, then, take up any extreme view of the necessity for interference in every case of lacerated cervix. Its relation to morbid womb conditions is now generally acknowledged, and we have especially to thank American gynæcologists for this, as for many other valuable additions to uterine pathology. We have, however, to avoid being influenced in practice by an exaggeration of the results which follow from a laceration. A careful examination of the uterus will enable us to judge of the case demanding operative interference, and the one which may safely be dealt with by palliative measures, or let alone.

Authorities are still divided as to the etiological importance of laceration of the cervix, in regard to various uterine pathological conditions. For example, Emil Noeggerath declares that 'women are *more* likely to conceive when there is a laceration than when there is not; the position of the uterus is *not* affected by laceration, its axis is *not* elongated as a consequence, erosions and ulcerations are *not* more frequently met with lacerations than without, they have *no influence* in producing uterine disease, eversion of the lips is *never* the direct

result of a laceration.' Noeggerath goes so far as to assert that laceration will soon disappear from the list of pathological affections of the uterus, and that operations for their cure will be things of the past. On the other hand, the eminent American gynæcologist Mundé declares that cervical lacerations do act as predisposing factors in the production of uterine disease, the frequency and severity of the lesions increasing directly in proportion to the length and depth of the tear. He also arrives at the conclusion that they lessen the productive fertility of a woman. I believe that the truth lies in the mean between these two extremes of opinion—certainly rather on the side of the American view of the importance of the lesion.

I have seen a lady who was stitched in America for a laceration of the cervix, 'unstitched,' as she expressed it to me, by another surgeon there, for too successful closure of the cervical canal (that is, the cervix uteri was divided), and she was 'stitched' a second time for too free undoing of the previous 'stitching' of the original tear. Subsequently she nearly lost her life in London through an attack of peritonitis after a curetting operation from which she derived not the least benefit. Each time she came I deprecated interference. She simply had 'uterus on the brain.' She subsequently went through some form of operation for so-called 'removal of the neck of the womb,' though when she came to me after this step, and pressed me to again examine her, my gynæcological sense of touch was not sufficiently educated in point of delicacy to detect an absent cervix. Will she have this incorporeal neck bisected for a second time by some as yet unknown gynæcological benefactor? History may record!

With regard to recent lacerations, many advocate, and apparently with reason, that the sooner the rents are closed, the better, the sutures acting also as a hæmostatic. It is asserted that the lochial flow does not prevent primary union, but any such operation must be conducted with every possible antiseptic precaution. Dodelin, Sanchez, Toledo, and Strauss have shown that the normal lochial discharge, when taken from the uterus, is devoid of germs, but that if there be fever, both bacilli and cocci are found, which are eliminated with more abundant secretions of a purulent character. The pathogenic microbe is the *Streptococcus*. Similar germs have been found by Péraire in the secretions of puerperal metritis.

I could instance several cases of women restored to health and procreative capacity, whose lives were miserable before extensive lacerations were cured, and I have seen several cases in which I believe the predisposing cause of serious uterine

disease lay in old eversion and erosion, the consequence of an unremedied rent in the cervix.

Diagnosis.—Though in the majority of cases there is not any difficulty, with a careful examination, in discovering a laceration of the cervix, still, there is little doubt but that it often escapes detection. This is more apt to occur when there is a considerable abrasion of the cervix—the so-called 'ulceration' of the os uteri.

When the cylindrical speculum is used, this is more likely to happen, for we may press the lips of the fissure together, and thus close the torn lips of the mouth of the womb.

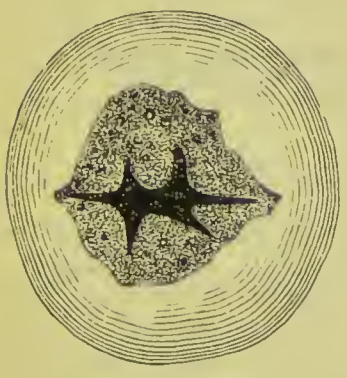


FIG. 242.—Bilateral laceration, 1st degree (Bonnet and Petit).

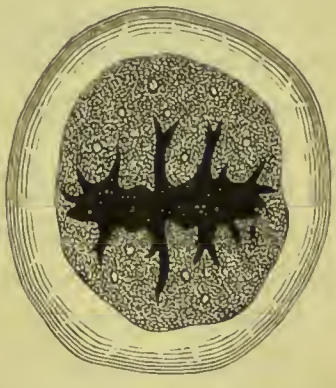


FIG. 243.—Bilateral laceration, 2nd degree (Bonnet and Petit).

An examination for a laceration of the cervix *must be* made in this manner: The woman is placed in the semi-prone position, and Sims' speculum is applied: a tenaculum is hooked into each lip of the rent, and the two are drawn forwards, when, if it be a laceration, the raw surface disappears, and the characteristic cleft is left.

Consequences.—Erosion of the os and cervix; eversion of the cervical canal; subinvolution; endometritis; perimetritis; cicatrization of the cervix, and sterility. There is little doubt that it predisposes to epithelioma and malignant disease of the cervix.

Symptoms.—These will depend, in urgency and severity, on

the extent and depth of the laceration, and the inveterate character or the intensity of the attendant complications. If the laceration be chronic, and have not skinned over, we frequently find an easily-bleeding cervix, menorrhagia, endocervical discharge, pain in walking, loss of sexual desire, neuralgia, and reflex nervous disturbances.

Treatment.—It is either palliative or operative. The palliative treatment consists in rest, warm vaginal douche, local depletion, attention to the eroded cervix, glycerine tampons, and astringent douches. Such remedies as borax and glycerine, tannin and glycerine, carbolic acid and glycerine with iodine, ichthyol, chromic acid solution, and the other means spoken of for the treatment of menorrhagia, are applied. Preparations of the mineral acids with quinine and bark are indicated. If the womb is in a state of subinvolution, ergot may be administered.

To help in the skinning over of the eroded surface, and the glazing of the congested papillæ, preparations of iodine, hydrastis, chromic acid, weak nitrate of silver, and perchloride of iron solutions may be used locally.

Emmet advises, as a palliative measure, the passing of a silver suture through the flaps to prevent them from gaping.

Operative Measures.—These are not to be thought of until by such palliative treatment as that just detailed the uterus is brought into a fit state for operation, and all symptoms of inflammation or perimetritis have disappeared. The week after a menstrual period is chosen. The bromides may be given for a few days previously, and a hot vaginal douche to restrain the bleeding is used immediately before the operation. The instruments required are a vaginal douche, a few duck-bill specula, a long-handled knife, a curved scissors, a tenaculum, some short lance-headed needles of Emmet or Sims, needle-holder, a reel of twisted silk, or silver wire, a forceps, and a Clover's or Alexander's crutch.

Trachelorraphy is thus performed. The patient is brought (anæsthetized, though not necessarily, as the operation is not

very painful) well to the edge of the bed or operating couch. The lithotomy position is by far the most convenient for operating. A crutch is used to separate the thighs. The cervix is exposed, and drawn down with the vulsellum, and

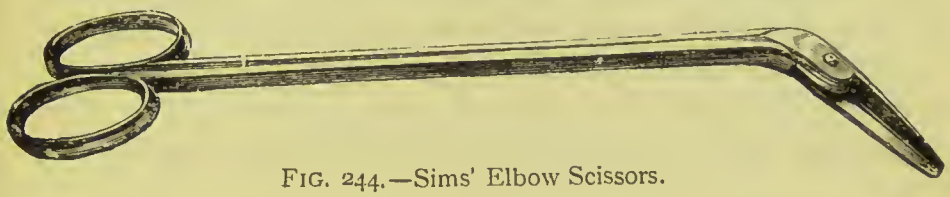


FIG. 244.—Sims' Elbow Scissors.

kept in position by an assistant. The edges of the laceration are first brought into a position to judge how far the uterine surfaces have to be denuded. A stout rubber watch-spring ring

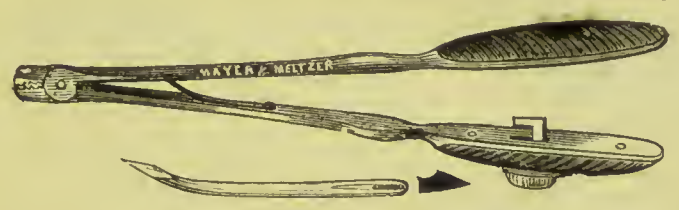


FIG. 245.—Emmet's Needle and Holder.

is slipped on to the base of the cervix to control bleeding. The vagina is washed out with some carbolized water.

The operator begins by denuding one side of the laceration,

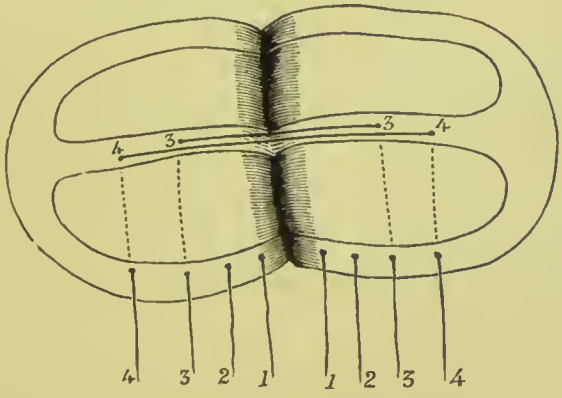


FIG. 246.—Emmet's Operation—denuded surface and sutures.

and removing the tissue, as shown in the drawing. The cicatricial tissue in the angle of the laceration is completely removed. The same step is taken on the other side if the

laceration be bilateral. A broad strip of the cervical surface is left untouched, to form a future cervical canal.

Fig. 246 shows the surface denuded, and the course of the sutures, after Emmet. Fig. 247 exemplifies the way in which the sutures lie in the cervix before they are tightened. Fig. 248 explains the closure of the cervix and the tying of the sutures. The sutures are passed in the order 1, 2, 3, 4. One side is first united and closed, and afterwards the others. It

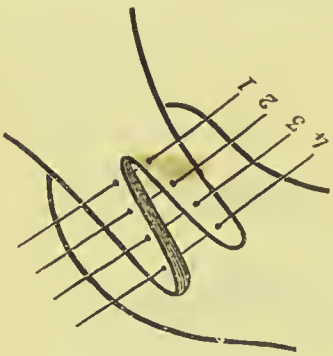


FIG. 247.—Sutures passed.

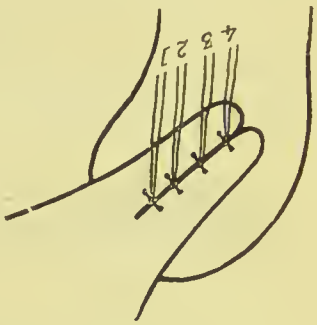


FIG. 248.—Sutures applied.

is better, after operating, to draw off the patient's urine. But from the third day she may pass water herself, leaning forward on her knees. The vagina is regularly washed out with some weak disinfectant wash. The silver wire sutures should not be disturbed for ten or twelve days. I have, to my disappointment, found removal of the sutures on the seventh day prevent the union which, had they been undisturbed, would have been secured. I believe the mistake which causes many failures after all perinæal, utero-vaginal, and vesico-vaginal operations is too early interference with the sutures.

CHAPTER XVI.

EROSION, GRANULAR AND FOLLICULAR DEGENERATION OF THE CERVIX.

Pathology.—The term 'ulceration' of the uterus has almost disappeared from the vocabulary of the gynæcologist. This remark refers to ordinary inflammation, as malignant and syphilitic ulcers have still to be described. But that common condition, which was ordinarily regarded as one of ulceration, has been proved to be nothing more than a desquamation of the superficial epithelial layer covering the lips of the os uteri and cervix.

The reader will here refer to the remarks on the Pathology of Chronic Endocervicitis; and the more recent observations of Bonnet, Petit, Landau, Abel, and Cornil on this subject (page 316).

This is attended by increased vascularity and growth of villous projections, which protrude on the surface under a single layer of epithelial cells. Up to a comparatively recent date, it was taught that the bright spots seen within the area of the eroded or granular patch were hypertrophied papillæ, enlarged and highly vascular. Thus, Scanzoni describes an 'aphthous' erosion, in which the mucous membrane is denuded of epithelium; and Schroeder includes a notice of 'ulcers' of the cervix with 'erosions,' and he describes a papillary form of erosion in which the papillæ develop into 'granular elevations.' According to the researches of Ruge and Veit, the raw surface is covered with a single layer of epithelium, and the supposed papillary granulations are neoplastic formations. Recesses are formed by extensions inwards of the epithelium,

and thus a papillary or villous appearance is given to the erosion. Friction, even such as is necessitated in wiping away the thick purulent secretion which is found covering the cervix, causes bleeding from the superficial bloodvessels. This state has received the name in this country of 'cock's-comb' ulcer or granulation. But the accompanying change in the follicles of the cervix is not to be lost sight of. The glands are distended, the openings are gradually closed, through swelling of the adjacent tissue or the formation of new connective tissue. Cysts are formed, some of which may burst on the surface and discharge their contents. This cystic degeneration may involve the entire cervix.

Plimmer, in a paper on 'The Diagnosis of Growth of the Cervix Uteri' (*Brit. Gyn. Jour.*, November, 1895), says:

Varieties of Erosion.

'This is a condition, also, which should be watched, and in which pieces should be examined from time to time according to the clinical symptoms. We must never forget, also, that with every inflammation hyperplasia of epithelium may occur.

'As regards the so-called "erosions," they are characterized by the vaginal surface of the cervix, which is normally covered by squamous epithelium, getting covered by more or less cylindrical epithelium, which may sometimes even dip a little into the tissues. This condition is really so like ectropion that it is only in a virgin uterus that it can be easily differentiated. A real erosion in the pathological sense it is not, but rather the covering of a surface with columnar epithelium, which normally would be covered with squamous epithelium. There is here not much change in the connective-tissue stroma, and only a small quantity of round-celled infiltration. The dipping in of the columnar epithelium into the tissues forms gland-like formations, which, however, are much shorter than the ordinary cervical glands. This is the condition usually called "*erosio simplex.*" When this columnar epithelium sinks deeper into the connective-tissue stroma, and is raised to the original level of the surface, small pseudo-papillæ are formed; this is the so-called "*erosio papillaris.*" Again, if the surface is flatter, and more columnar epithelium is cut off in the deeper parts, it is called "*erosio follicularis.*" But these old distinctions are not clear, nor are they ever separated in a typical case, so the characteristics of erosion mentioned before are better; namely, the covering of a part of the cervix normally covered with squamous epithelium with columnar epithelium which dips more or less deeply into the connective-tissue stroma; and characteristic also of "erosion" is that this part of the connective tissue stroma, which is normally free from glands, has a number of gland-like bodies produced in it, concurrently with the covering of its surface with cylindrical epithelium.

'There are also, no doubt, cancerous erosions, but in the opinion of many

Continental writers the relations of erosions to cancer have been much overrated. Usually, in the cases in which the "erosion" appearances described above are seen, there will be no cancer found.'

Causation.—Erosion of the cervix, with cervical catarrh, is perhaps the most common of all the diseased conditions of the uterus which we are called on to treat. This does not surprise us, when we remember that it may attend on all the other congested states of the uterus and cervix that we meet with in practice: as, for example, displacements, lacerations of the cervix, and vaginitis. We find it present in tubercular, syphilitic, and strumous constitutions. It may be induced or aggravated by the use of a pessary. I feel certain that this latter habit acts more frequently as an exciting cause than is generally thought.

Symptoms and Physical Signs.—These will in great measure depend upon the degree to which the uterus is involved in any coexisting disease, such as endometritis, hyperplasia, vaginitis, gonorrhœal infection. Coloured leucorrhœal discharge, pain when walking or standing, lumbar and sacral pain, dyspareunia, general lassitude, inability to undergo fatigue or any exertion, and loss of appetite, are among the symptoms most frequently complained of. On digital examination, the os uteri feels soft and moist, and the granular or eroded surface is felt by the finger. With the speculum, the os uteri and adjacent cervix are seen covered with a creamy purulent discharge, perhaps tinged with blood. When this is wiped off with a little cotton-wool, the underlying eroded or granular surface is seen. Frequently there is a fissure of the cervix, the result of an old laceration. The os and cervix bleed readily when they are wiped with a sponge or wool. If endometritis coexist, the characteristic tenacious discharge issues from the os uteri. If there have been gonorrhœa, the uterine discharge is purulent, of a dirty yellow colour, covering like a layer of discoloured cream the surface of the wool. It has a slight fœtor. In these cases also there is accompanying vaginitis, and probably, if the disease be chronic, an accompanying granular condition of the vagina.

Treatment.—There are some general hints regarding the

treatment of erosion of the eervix I think it well to press on the surgeon:

Give a guarded opinion in reply to the question of the patient or friend, as to the length of time a severe erosion or granular eondition of the eervix will take to heal. The affection, espeeially if there bé any eoexisting disease of the uterus, must be tedious.

A fair judgment of the tendeney to eure may be formed from the subsidenee of the villous projeetions; the disappearanee of granulations; the paleness of the exposed surfaee, and its diminished vascularity; the tendeney to skin over; the diminution of diseharge.

There is a danger of *over-treating* this affeetion by too frequent use of eausties or astringents. The strength of every applieation must be regulated by the severity of the ease, and determined by the surgical instinet of the praetitioner. No routine rule of using this or that strength of any agent should be followed.

Plaee as mueh reliance on physiologieal rest and soothing applications as on loeal medieation.

Do not pronounee the ease *cured* until the surfaee has eompletely healed and the patient has been subsequently under observation for a short time.

When a patient presents herself with an eroded eervieal surfaee, the first point for the surgeon to determine, and on which not a little of his future peaee of mind and the satisfaction of his patient depend, is to what extent is the eanal of the uterus involved in the inflammatory process. This will demand a eareful examination of the uterus and of the diseharge which is present. If he have any suspicion that endometritis to any extent eomplicates the erosion, the uterine eanal should be forthwith dilated, and the endometritis treated. There is no use in temporizing by repeated dressings with eroded states of the cervix. And it is useless to apply caustics to the external os if there be an endometrie discharge left to ease irritation of a partially healed surfaee. It will generally

be found that the most satisfactory plan is not to dally over various topical applications, but to at once proceed to dilate the cervical canal, and treat the endometrium as far as it requires to be dealt with, making at the same time a careful application of nitric acid to the eroded patch.

This treatment should be followed by careful dressings up to the next menstrual period, and, after it has passed over, another inspection of the uterus should be made, and any spots that remain unhealed should be redressed with the acid.

If the uterus be displaced, it is wiser not to readjust it until the erosion be healed, and a suitable pessary can be worn without risk.

General Management.—Rest in the horizontal position, avoidance of exercise, interdiction of all sexual intercourse, the administration of such tonics as quinine and arsenic, mineral acids and bark.

Local.—Vaginal douches, with one of the following agents added to the water: borate of soda, sulpho-carbolate of zinc, acetate of lead, Condy's fluid, carbolic acid, alum, tannin (ʒss. of the borate of soda and ʒi. of one of the other agents added to a quart of water), perchloride of mercury ($\frac{1}{5000}$), liquid extract of hydrastis.*

Topical Applications.—Nitrate of silver (the fused sticks before referred to, or the solution in different strengths); carbolic acid and glycerine; nitric acid; Richardson's styptic colloid; pigment of iodine and ichthyol (iodine ʒi., rectified spirit ʒi., ichthyol solution in glycerine 5 to 10 per cent., flexile collodion ʒss.); chromic acid (ʒi.—ʒi.); iodoform; perchloride of iron solution (ʒi.—ʒi. glycerine); chloride of zinc (ʒi.—ʒi.); liquid extract of hydrastis with glycerine; biniodide of mercury. This latter preparation is applied by first painting the eroded surface with perchloride solution, and immediately washing the surface with an iodide of potash solution, when the red deposit of iodide of mercury forms on the part.

* I have with benefit of late used chinosol both in douche and tampon.

Vaginal tampons of glycerine, glycerine and tannin, glycerine and boric acid, glycerine and hydrastis, glycerine and ichthyol, iodine and glycerine, chinosol.

Ointments (to cleanse and soothe irritation) of vaseline, with carbolic acid, iodoform, iodol europhene, ichthyol, tannin, belladonna, morphia. (A few grains of coumarin will disguise the odour of iodoform.) For my own part, I do not resort to the use of ointments in the treatment of erosion.

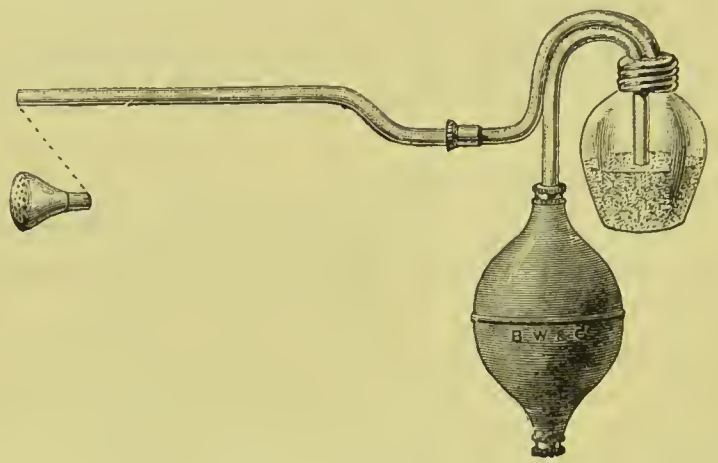


FIG. 249.—Author's Vaginal and Uterine 'Speculum and Operating Insufflator' (Burroughs and Wellcome).

FIG. 250.—Duke's Insufflator.

Scarification.—Much benefit may be derived by the abstraction periodically of a little blood with the uterine lancet.

Suppositories.—The best are those of belladonna, opium, cocaine, acetate of lead, tannic acid, oxide of zinc, and iodoform.

Alexander Duke advocates Sehwartz's dry treatmcnt of crosion. He says: 'The credit given to thc dry treatment of sores and wounds in general surgery induced mc also to givc this a trial. I found that the insufflators usually sold held very littlc, and as it requires *at least half an ounce* of powdcr for cach applieation in thesc cases, I had a vaginal insufflator made to eontain it, and

which the illustration will help to explain. It is similar in form to a covered spoon, and on the lid being raised it can be easily filled by being dipped into any receptacle containing the powder. When filled the lid is closed, and on being introduced into the vagina the rubber ball is compressed a few times, and the powder deposited on the os and vaginal walls. I have had excellent results in cases of slight erosion of the os, and also in cases of leucorrhœa, whether of long or short duration—in conjunction, of course, with general treatment.

'The convenience of this form of insufflator should recommend it, as it can be used with or without the speculum. The vagina should be washed out in all cases, to remove the secretions thoroughly, previously to the application of the powders, and thus obtain their full value. I have found a powder composed of equal parts of alum, oxide of zinc, and boric acid very useful as a general rule, but the practitioner can choose the powder best suited to the case at his own option. The comfort of the patient is another consideration, and those who have experienced the discomfort of the glycerine tampon and other moist applications have invariably expressed a wish for the dry treatment in preference.'

FOLLICULAR DEGENERATION.—Three pathological conditions of the os uteri and cervix are closely allied to each other, both in their etiology and histology; these are: follicular degeneration, follicular hypertrophy, and mucous polypi. All three are sometimes associated with either a congested, eroded, or lacerated cervix, and eversion or 'ectropion' of the lips of the os uteri. Congestion and hyper-distension of the glands of the cervix (ovula Nabothi) lead to a general cystic condition, and the cysts either rupture, or through hypertrophy of the subjacent tissue are forced forwards in the form of polypi, or form, in the external vaginal surface of the os uteri, gray or yellow cystic projections, which frequently have purulent contents, but are more usually filled with colloid matter. Sometimes the collapse of the follicle is followed by a depression on the surface of the cervix. This little pit slowly disappears. The contents of the cysts are granules, mucous corpuscles, and epithelial cells; they are lined by a basement membrane (Farre). If the cystic degeneration of the follicles of either one or both lips of the os should proceed unchecked, and there be an increase in the connective tissue of the cervix, a state of general hypertrophy ensues, attended

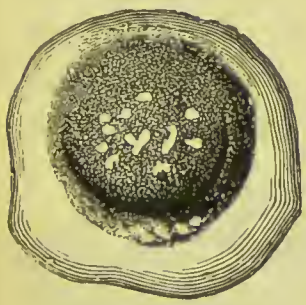


FIG. 251.—Follicular Hypertrophy (Pozzi).

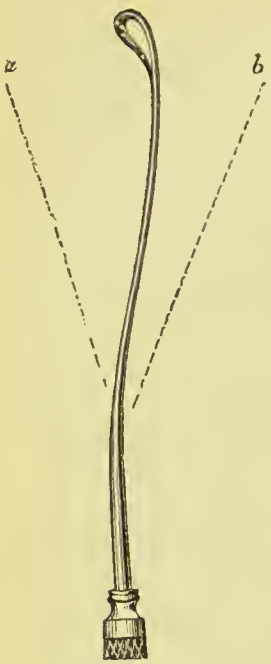


FIG 252.—Sims' Curette.*

at times by fungous growths. This 'follicular hypertrophy' (Schroeder) of the cervix we thus see commences in follicular degeneration and cyst-formation; the polypoid character of the cystic growth being, in this instance, prevented by the investing and resisting epithelium of the vaginal surface of the cervix. Mucous polypi are found rather in elderly multiparæ.

Diagnosis.—The presence of the numerous small cysts, and the nature of their contents; the appearance of the characteristic polypus protruding from the os; the soft, cystic-looking, and enlarged lip, will readily distinguish the three conditions. Should a cyst rupture, and an apparent ulcer form, this softened state of the cervix might be mistaken for malignant ulceration.

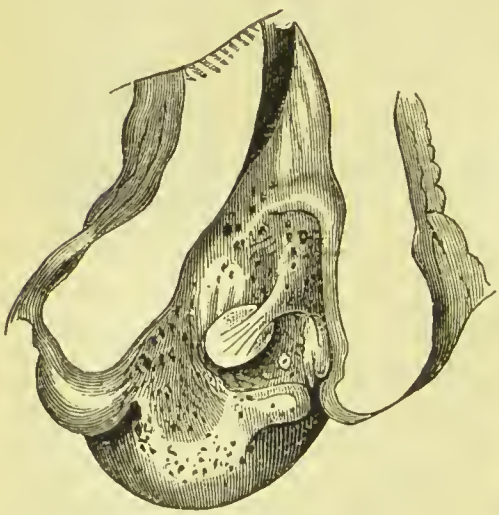


FIG. 253.—Follicular Hypertrophy of the Cervix—sectional view (Pozzi).

FIG. 254.—Mucous Polypi growing from the interior of Cervix, following Follicular Hypertrophy (Pozzi).

Such an error I have known committed in a case in which I subsequently ablated one lip of the os for cystic hypertrophy.

* See p. 134 for other curettes.

LEEDS & NI... MED. CHIRURGICAL SOCIETY

Treatment.—Cysts must be opened and curetted, or the contents evacuated, and chromic acid, carbolic acid, or nitric acid applied to the cavity. A mucous polypus must be removed with scissors or forceps. If we suspect the presence of small polypi inside the cervix, the canal is dilated, and resort had to the curette, forceps, or long scissors for their removal. Nitric acid (Atthill) or chromic acid may be used to destroy very small polypoid projections into the canal. In very obstinate cases of cystic degeneration and follicular hypertrophy, the diseased vaginal portion of the cervix may require ablation with either scissors, knife, or the wire of the galvanic écraseur. (*Vide* Amputation of Cervix, p. 280.)

CHAPTER XVII.

PERIMETRIC INFLAMMATION AND PERI-UTERINE PHLEGMON.

THERE are three localized forms of inflammation, which might well be considered in connection with each other under the heading of *Perimetric Inflammation.* These are:

1. Perimetritis.
2. Ovaritis.
3. Salpingitis.

Two of these, ovaritis and salpingitis, though placed in this work under the portions devoted to affections of the ovaries and Fallopian tubes respectively, might well be studied by the student in connection with the other forms of pelvic inflammation.

PERIMETRITIS.—By perimetritis we mean inflammation of the pelvic peritoneum, and limited to it.

As regards *clinical differentiation between perimetritis and parametritis*, we must abandon the theoretical distinction which, rather on anatomical than clinical grounds, has been drawn between these conditions. I am in full accord with Emmet and others, who declare that clinically this theoretical distinction disappears, and that it is impossible (at least in the majority of cases) 'to make any distinction at the bedside.' I believe it would be better clinically to retain the term perimetritis alone, and include under this head all secondary inflammation in the cellular tissue in the neighbourhood of the uterus. This may primarily occur between the layers

of the broad ligaments, between the bladder and uterus, between the vagina and posterior wall of the uterus. The cellular tissue around the neck of the uterus may be the original seat of the inflammatory effusion or phlegmon, but as a consequence we frequently have salpingitis, ovaritis, and different degrees of pelvic peritonitis, with effusions, occurring in Douglas' pouch. On the other hand, the inflammation may commence in the peritoneal folds of the pelvis, anteriorly or posteriorly, and effusion may occur primarily inside the peritoneal cavity, as it commonly does in the pouch of Douglas. Here cellulitis is a secondary result of the pelvic peritonitis, and both the serous linings or folds and the cellular tissue of the pelvis are alike involved in the inflammation and resulting effusion. The secondary peritonitis may be as limited or localized in the case of the primary cellulitis, as the secondary cellulitis is in the instance of the primary peritonitis.

Hardon has drawn a distinction between true cellulitis and the fulness and hardness due to the turgescence and engorgement of the large venous sinuses in the broad ligaments consequent upon pressure and dragging of the uterus. Proper elevation of the uterus relieves this congestion. This venous engorgement points to the facility with which, in such cases, operative interference (Emmet) occasionally leads to phlebitis and septic sequences.

The relation of pelvic cellulitis to peritonitis is a matter of extreme importance. Does the cellulitis precede the peritonitis, or *vice versâ?* Polk first in 1886 ('Transactions of the Association of American Physicians'), from a series of observations made by him in the Bellevue Hospital, argued that peri-uterine inflammation is a product of salpingitis, that the cellulitis is secondary to the peritonitis. This is the view advanced in previous editions of this work. Cullingworth, in an interesting article (*British Medical Journal*, December 27, 1890), declares himself in favour of Polk's view. This is the attitude of the majority of modern gynæcologists to this question.

I quite agree, however, with the statement that 'the inflammation in the great majority of cases begins in the mucous membrane of the uterus, either from septic absorption or the poison of gonorrhœa,' or from other infective cause. And this view has already been urged in dealing with the course of metritis and endometritis. Pain is often absent in perimetric inflammation until the peritoneum is attacked. And the sound clinical axiom, that 'neither a *clean* wound nor a *clean* sound

ever produced cellulitis' (the italics are the author's), is one I thoroughly endorse, and it places in its proper light the responsibility resting on the shoulders of every practitioner who uses the uterine sound, to see that the sound itself, and the vagina of his patient, are clean and free from any infective organisms before the instrument is passed into the uterine cavity.

The frequency with which perimetritis is met with in practice

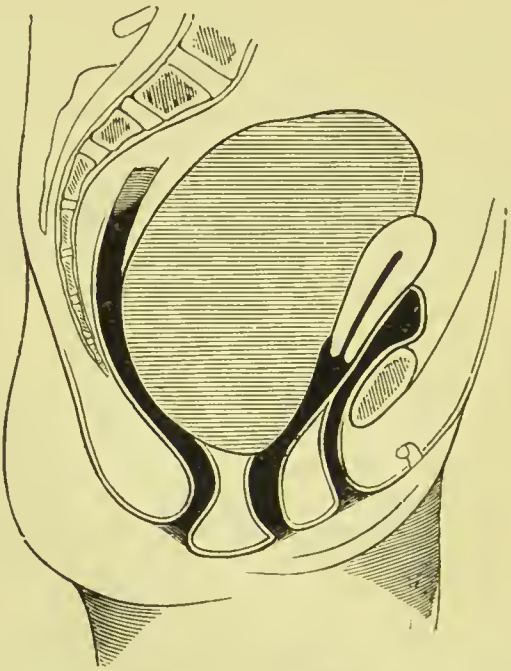


FIG. 255.—Collection of Serum in the peritoneal cavity—Perimetritis Serosa (Schroeder).

may be inferred from the following statement of Matthews Duncan :

'Adhesive perimetritis is almost certainly second in point of frequency among the diseases of women, the first position being held by uterine cervical catarrh ; in post-mortem examinations of women no pathological condition is more frequently discovered than adhesions between the internal genital organs and neighbouring parts, especially about the ovary.'

Anyone who, like the author, has spent a number of years (ten) in an anatomical theatre, and who has been engaged in making dissections of the female pelvic viscera, will verify

this conclusion. 'I do not exaggerate,' says Emmet, 'when I assert that pelvic cellulitis is by far the most important disease with which woman is afflicted.'

Causation.—Perimetric inflammation is constantly associated with acute metritis and endometritis; ovaritis; salpingitis; septicæmia; pyo salpinx; arrest of menstruation (due to the effect of cold); abortion and parturition; operations on the uterus and vagina; the passage of the uterine sound; the use of tents; gonorrhœa; imperforate hymen and concealed menses; ovarian cysts; uterine fibroids; tubercle; cancer.

Micro-organisms in Pelvic Suppurations.

Cases have been recorded by Hartman and Morax (*Anal. de Gynæcol.*, xli., p. 193, 1894; Schmidt's *Jahrbücher*, Band 244, 1894), showing that acute aseptic peritonitis may occur. No micro-organisms could be discovered in the sero-fibrinous fluid that was examined. The same authors (*Rev. de Chir.*, p. 343, 1894) showed that cases of catarrhal salpingitis, hydro-salpingitis, retro-uterine hæmatocele, with fever, may occur without the presence of micro-organisms. The same is true of a proportion of cases of suppuration of the annexa, but in a large proportion of the latter streptococci and gonococci were found.

In the pus of suppurations of the annexa are found the streptococcus pyogenus (the infective bacterium of puerperal septicæmia); the gonococcus; the bacterium coli commune; the staphylococcus aureus; the bacilli of tubercle, and the cladothrix of actinomycosis.

Pathology.—The division of perimetritis (Matthews Duncan) into three kinds—adhesive, serous, and purulent—answers all practical purposes. In the first variety there is an exudation of plastic lymph from the engorged and turgid peritoneal vessels. This results either in temporary adhesions between the pelvic viscera, or in permanent adhesions which remain for the lifetime of the individual, causing dragging and displacement of the ovaries and Fallopian tubes, binding these down, or connecting them with each other. These adhesive bands or membranous layers may shut off a collection of pus or serum, forming cyst-like cavities. Such an accumulation is shown in Fig. 255.

In the serous and purulent varieties an exudation of serum or pus occurs into the peritoneal cavity, and naturally first collects in the most dependent situation, which is Douglas'

pouch, pushing upwards the coil of intestine which is contained in it when the bladder and rectum are empty. The serous fluid, as it increases in quantity and becomes harder, may press the uterus forwards against the pubes. At other times the exudation occurs at the sides of or all around the uterus, and it may rise over the fundus of the uterus above the pelvic brim into the abdominal cavity. A limited collection of serum or pus may form between coils of intestine; this, after absorption or rupture, may leave adhesions and inflammatory thickening of the peritoneum. The quantity of pus which thus collects in the peritoneal cavity is very large; take, for example, the following case, reported by me as far back as the year 1881:

J. C., aged 32 years, was admitted into hospital with a history of pelvic peritonitis after parturition. The pain and enlargement commenced a week after labour. There was enormous distension on admission. The patient was aspirated on the 16th, and over *nine pints of pus* drawn from the peritoneal cavity. This quickly re-secreted, and *five pints* more were taken to relieve the sense of hyper-distension and consequent uneasiness. Eleven days subsequently the abdomen was opened antiseptically; all the pus was evacuated through an incision of about two and a half inches. The peritoneum was greatly thickened; it was hooked carefully up and held in contact with the abdominal parietes; then a Keith's glass drainage-tube was passed and held in position in the wound by sutures; the peritoneum was stitched from within to the abdominal wall as in ovariotomy; a drainage-tube with a wire coil inside was attached to the glass tube, its other end resting in a bucket of carbolic water, which was placed at the side of the bed. The pus drained into this for nearly three weeks. The glass tube was taken out each day, and the wound was dressed, the orifice carefully cleansed, and the rubber tube well washed out with carbolic solution, the end of the tube being corked under the carbolic water whenever the latter had to be changed. Suffice it to say that the patient lost, at the lowest calculation, some forty pints of pus while in hospital. For the last five weeks the opening was kept patent to secure drainage by a bunch of carbolized horse-hair carried well into the cavity. The discharge gradually ceased. A hard mass filling the pelvic brim remained. This finally disappeared. The woman became quite strong and well, had a good appetite, and was only anxious to leave the hospital. During my absence from home, the patient, having been up and out for several days, suddenly complained of pain; symptoms of collapse set in with intense pain and vomiting, and she died in twelve hours from the onset of the symptoms. The house-surgeon made a post-mortem examination, and found that a recent rent had occurred in the pelvic peritoneum, through which a small quantity of fetid pus escaped into the general peritoneal cavity; adhesions had formed which protected the bowels, but the peritoneum was greatly thickened in parts. A funnel-shaped canal led up to the abdominal opening, and some fetid pus was

found at the side of the uterus. I regret much my absence from the autopsy of this most interesting case.

Since I first published the details of this case the treatment of large pelvic abscess* and suppurative peritonitis has considerably advanced, cœliotomy and free flushing out of the peritoneal cavity with an antiseptic solution being the most efficient mode of treatment (Mayo Robson). I feel confident that in a similar case abdominal opening, with a counter-opening in the vaginal roof—thorough drainage being obtained and maintained—might completely cure. The patient lived nearly four months from the date of the abdominal section.

Some years since, I saw a girl, aged eleven years, with Dr. Bastable. The abdomen was distended with fluid. Some pus was oozing from the umbilicus.

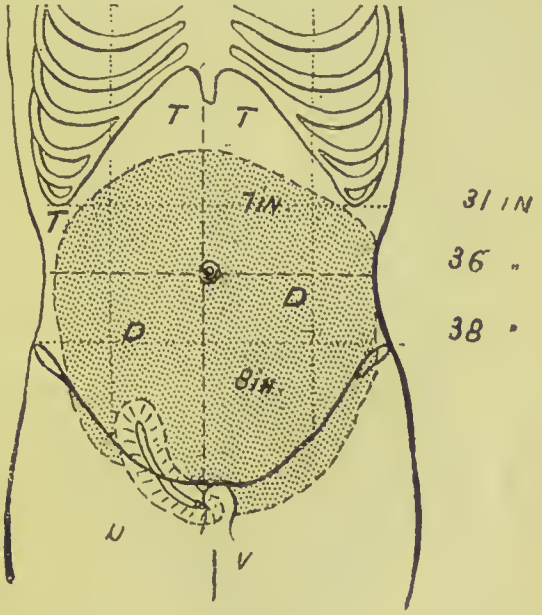


FIG. 256.—A, line of incision, exposing anterior layer of broad ligament, with numerous vessels distributed over it; T, T T, tympany; D, dulness; U, uterus displaced to left, fixation partial. Cured by abdominal section and drainage (Wallace).

I passed in an aspirator and drew off about a pint of pus. The next day, under ether, I made an opening into the peritoneum, drew up its margins, and fixed them to the abdominal wall with sutures, first evacuating a large quantity of pus with the aspirator. I then passed a Keith's drainage-tube downwards towards the pelvis, to the other end of which was fixed a tube draining into water, the tube being fixed in with cross-straps of adhesive plaster, and the entire abdomen covered with antiseptic dressings, which were used all through. When the fluid was drawn off, a suprapubic mass was detected. This completely disappeared as the child got better. For three weeks the drainage-tube was retained. Dr. Bastable estimated the quantity of pus drained from this child at eleven pints. She made a perfect recovery.

Professor John Wallace has exemplified, by a series of cases, the advantage

* For Treatment of Pelvic Suppurations, see p. 361.

of the treatment of collections of fluid in the peritoneal cavity by opening and drainage with antiseptic precautions. Two of his diagrams (Figs. 256 and 257) I insert to show the extent to which such fluid collections may reach and yet be cured.

The abscess may open into the rectum, the vagina, the bladder, and, very rarely, into the uterus. It may point in the groin, the upper part of the thigh, in the region of the sciatic notch, in the lumbar region. I have seen cases which have burst into the rectum, vagina, bladder, and the groin.

A sudden escape of pus into the general peritoneal cavity is, as a rule, followed by fatal peritonitis, or septicæmia. But, not infrequently, absorption of large collections of fluid takes

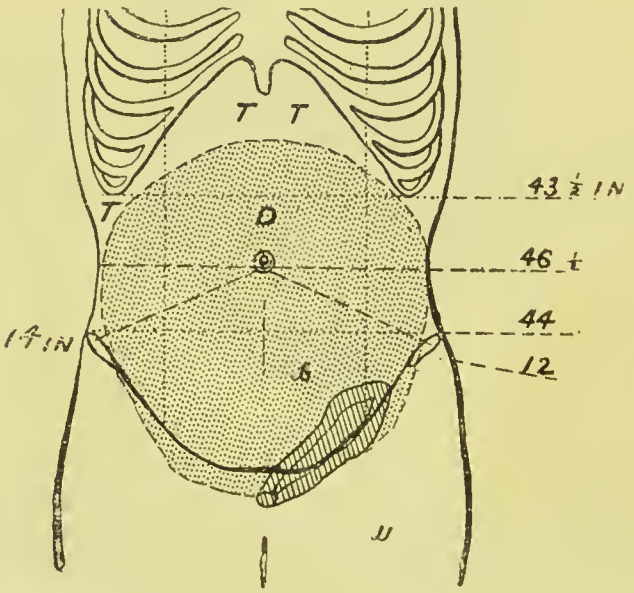


FIG. 257.—D, dull area of tumour; T, T, tympany; U, uterus displaced downwards and to right behind tumour; V, fixed with tumour to pelvic walls. Cured by abdominal section and drainage (Wallace).

place, and the patient returns to health; this, however, is generally a very slow matter, nor does it often happen without leaving some exudation or adhesion, which feels like a circumscribed tumour in the pelvic roof.

Certain it is that mature clinical experience teaches this lesson, that it is not right in these cases to continue for any length of time an expectant plan of treatment. There is

always the risk of septic absorption, of secondary degenerations in the ovaries and tubes, and various imprisonments of fluid effusions in the broad ligaments and elsewhere. Matting of the pelvic structures occurs. The pelvis may be explored when it is too late to do any good by operation, and when cœliotomy is worse than useless. This sad evidence of a policy of 'waiting on events' is unfortunately too often seen as a consequence of timidity or sanguine reliance on the *vis medicatrix naturæ*.

Symptoms and Physical Signs.—The symptoms will depend on the nature of the inflammation, whether it be acute or chronic. In acute pelvic peritonitis there are generally rigors, high temperature, rapid pulse, coated tongue, some gastric disturbance, vomiting. The symptoms are accompanied by abdominal pain, tenderness, and tympanites. On examination the abdomen is found very sensitive to pressure; the vagina is hot, perhaps swollen, and we may, comparatively early in the attack, be able to define a fluctuating swelling in the posterior vaginal cul-de-sac, or laterally through the vaginal roof. These signs of the affection are soon followed by the characteristic one of *fixation of the uterus*. There is a hard 'board-like' feeling (Doherty) anteriorly or posteriorly, the effusion displacing the uterus, or encircling it. Should the disease run an unfavourable course, the symptoms of septicæmia or general peritonitis set in; the vomiting increases; the temperature rises to 105° or 106°; the pulse is rapid and wiry; the countenance becomes more anxious; abdominal pain with tenderness and tympanites increases, and delirium sets in. In other instances the perimetritis is far more insidious in its onset, and the symptoms are so obscure that no local examination is made until the exudation is discovered, and it fills Douglas' space and fixes the uterus. Persistent abdominal pain varying in severity, or some pelvic distress either in the bladder or rectum, first calls for an examination, and the swelling is discovered. Such cases may run on for some time before advice is taken, often as much for the loss of appetite and wasting as for the local distress.

Many a case is assumed to be one of threatening typhoid, or some 'gastric' disturbance with hyperpyrexia, and is treated accordingly, until the more pronounced local symptoms and signs arouse suspicion, attention, and examination.

Appendicitis.

There is a possibility of mistaking in the onset of the inflammation an attack of appendicitis for pelvic peritonitis; and there is some justification for this in the severe pain which is complained of low down in the iliac region, and the rise of temperature. But the sickness, the intense inguinal pain, the sensitiveness and the swelling in this region, the constipation, the tendency to tympanites, the greater general distress, and the negative evidence afforded by a vaginal and rectal examination, should not, the chance of such an error being remembered, leave any doubt as to the presence of bowel complication. But I cannot refrain here from urging the grave need for caution in arriving at an early diagnosis of these cases of appendicitis and typhlitis, or perityphlitis. I have seen some regrettable errors made in this respect. It must be remembered that the symptoms in some cases of appendicitis, if they be obscure in the first instance, run on very rapidly after some forty-eight hours, and operative assistance may thus be deferred until it is too late. In an able communication on this subject, James Swain of Bristol (*Bristol Medical Journal*, March, 1894) divides appendicitis into four forms—simple, plastic, suppurative, and relapsing. He makes with reference to the last variety these important remarks:

'The next variety—that of rapidly perforative or fulminating appendicitis—is more common in young people, and is the most fatal of any form of appendicitis. Its seriousness is shown by the fact that in at least 75 per cent. of perforative cases it was the *first* attack which was accompanied by the perforation. The strangulation of the appendix in the way already explained is most complete, and rapidly runs on to gangrene of its walls, which then become perforated, with the rapid diffusion of the septic contents over the peritoneal cavity. Perforation does not usually occur until the second or third day, being preceded by the general and local pains and vomiting, as in other varieties. The temperature is not at first much raised. With the onset of perforation the symptoms

assume all the gravity of an acute general peritonitis. The pain, especially in the right iliac fossa, is more intense, and rapidly spreads over the whole abdomen, the vomiting becomes incessant, constipation is practically absolute, and the pulse is small and frequent. The general symptoms are at first those of shock, and the temperature may be low, although it subsequently rises to 102° or more if the patient should live for any length of time. The abdomen is at first retracted, and the abdominal muscles very tense, but later on there may be general abdominal distension from paralysis of the intestines. The face bears the usual anxious expression of acute abdominal disease. The patient may die

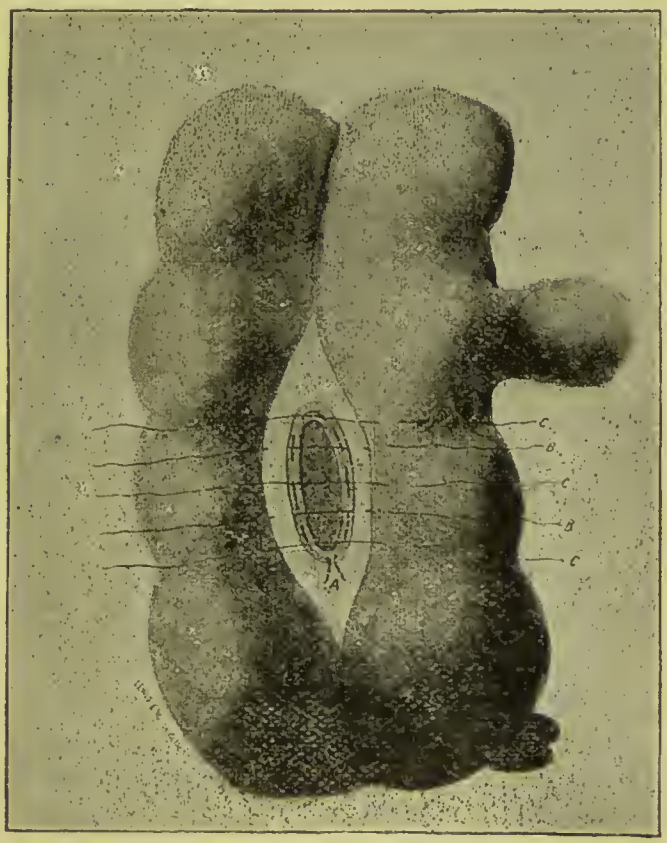


FIG. 258.—Showing relation of Adhesion (diagrammatic).

in a day or two, apparently from a general septic condition, before much suppuration has occurred; in some cases she may drag on for a fortnight or more, but eventually she dies of a general suppurative peritonitis. According to Fitz,* 98 out of 176 cases died in the first week.

I am indebted to Alfred Smith, of Dublin, for the particulars of this most interesting and instructive case which I here record, as it exemplifies so many points in the operation of cœliotomy.

* *Am. J. M. Sc.*, vol. xcii., 1886, p. 321.

Colectomy for Adhesion of Cæcum to Old Ovarian Pedicle and Tubercular Appendix.

Abdominal section was performed on October 11, 1892, when a right ovary, enlarged to the size of a billiard-ball, was removed along with the Fallopian tube quite close to the uterus. Shortly after the pain in the right inguinal region returned, and became so intolerable that the patient presented herself again, imploring relief by operation. Accordingly, on May 24, 1893, the abdomen was opened. The intestines did not fall away, and could not be

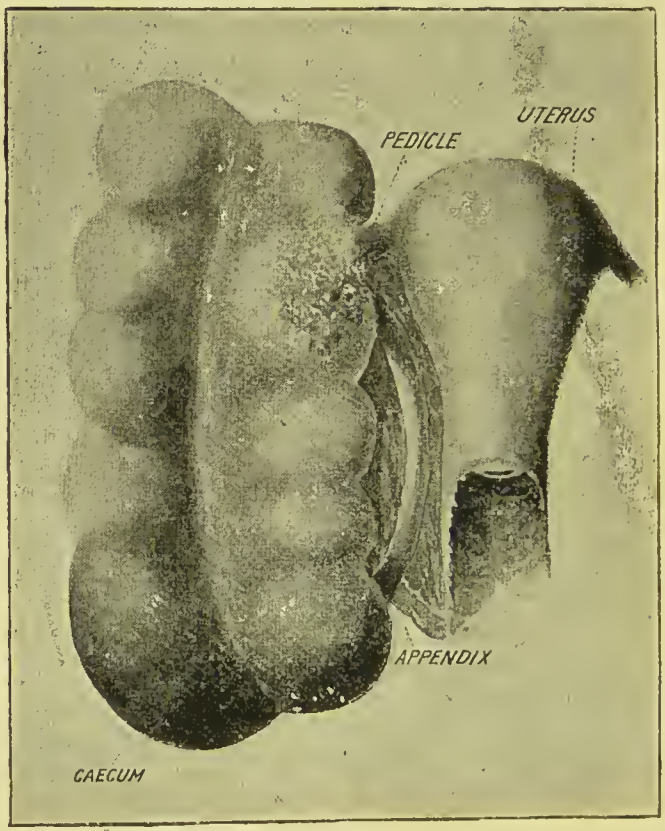


FIG. 259.—Showing adhesion of old pedicle of removed annexa adherent to cæcum and appendix.

pressed aside. The cæcum was adherent to the old pedicle by a very dense and intimate adhesion. The left ovary, which had increased to the size of a hen's egg, was removed along with the Fallopian tube close to the uterus. At first there was temporary relief after the operation, but soon the old dragging pain returned with renewed intensity, especially at night.

On November 29, 1893, the abdomen was again opened. There was a slight omental adhesion along the track of the old incision; the omentum and the small intestines had become anchored to the pelvic organs by fine adhesions.

There was some difficulty in getting the adherent pedicle well into view, but eventually it was brought well up to the abdominal incision.

The adhesion was separated—pus welled out, which was mopped up with moist corrosive wool, and the separating process was continued, revealing an extensive ulcerating cavity, formed by the end of the old pedicle, a portion of the wall of the cæcum and the vermiform appendix. The ulcerating surfaces were disinfected with corrosive sublimate solution, 1 in 1,000. The pedicle was short, quite close to the uterus ; it was swollen to the size of the last phalanx of the thumb. Many large veins could be seen, concealing the ulcerating surface like a monk's cowl. The old silk ligatures lay quite loose, and were apparently unchanged. The substance of the stump was very rotten. It was transfixed with a stout silk ligature and tied, and the ulcerating surface was cut away.

The vermiform appendix was quite turgescent, like a semi-erect penis, and pulsated regularly, the rhythm synchronizing with the pulse. It was eaten away by an ulcer of tubercular character, and its stem was greatly thickened.

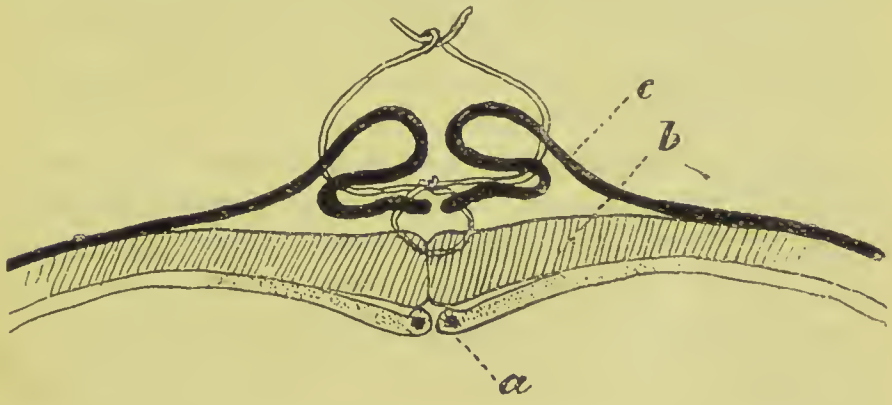


FIG. 260.—Sutures. *a*, purse-string ; *b*, intermediate, taking in edge of peritoneum ; *c*, Lembert's.

Two oblique incisions were made through its peritoneal covering, and the peritoneal layer was peeled back. The central portion was then amputated. The tops of the two flaps were next inverted, and brought together by two No. 4 silk sutures. The ulcer on the cæcum was the size of a florin, with undermined edges. It was tubercular. Its base was slit across to ascertain its extent. The ulceration penetrated as far as the submucous tissue. The intestine was held up while the entire ulcerating surface was snipped off with a scissors, leaving healthy tissue on all sides. The submucous tissue was brought together by a purse-string suture, and the muscular layers by interrupted (No. 4) silk sutures taking in the edge of the peritoneum, and finally the peritoneum by Lembert's sutures ; the pelvis was dried, and a drainage-tube was inserted.

About three hours after the operation the patient's temperature fell to 97° F., pulse 110, and the dressing was soaked with blood. A quantity of dark blood was aspirated. Very persistent and excessive vomiting set in, and was accompanied by violent abdominal pain. Morphia was given hypodermically. On

the effects of the morphia passing off, vomiting again returned. About nine p.m. the patient's symptoms of collapse set in, with severe abdominal pain. Evidently the pedicle ligature had slipped. She was too weak to remove from the bed; the abdomen was reopened as she lay. Blood welled up in quantities. By digital compression the hæmorrhage was checked, while the large blood-clots were rapidly removed. The silk ligature had cut through the rotten pedicle, and was hanging on to a shred. Hæmostasis was accomplished by transfixing part of the uterine wall with a silk ligature, and tying in two bundles, while separate ligatures were put on the vessels. The intestinal suture in the cæcum was then examined, and found to be well glazed. The abdomen was flushed with a warm saline solution, and a drainage-tube was left in. The patient's recovery was extraordinarily rapid and uneventful. The drainage-tube was removed on the fourth day.

This case illustrates:

1st. The value of drainage.

2nd. The rapidity of glazing after suture of the intestine.

3rd. The facility of suture by the purse-string and Lembert's method.

4th. That after copious hæmorrhage death may be arrested by prompt treatment.

5th. The necessity for careful examination of the vermiform appendix in cases of persistent right-side pain.

Prognosis.—Perimetritis is always a dangerous and serious affection. The principal dangers are: general peritonitis, phlegmon of the pelvic cellular tissue, pelvic abscess and septicæmia, metritis, uterine displacements, and, as secondary results, limited organized effusion, adhesion, atrophic states of the ovaries, obliteration of the tubes, dysmenorrhœa, and sterility.

Treatment.—In speaking of treatment, from what has been said on the subject of dilatation and curettage, it will be readily gathered that the immediate steps to be taken in a case of pelvic inflammation will entirely depend on the cause of the affection and the complications that are met with. In *acute* cases, opium in grain doses; an ice-bag on the abdomen; the application of Leiter's temperature-regulators; leeches to the hypogastrium; enemata; relief of the bladder by the catheter, if necessary. In the latter stages, vesication over the hypogastrium with the liquor epispasticus, followed by a stupe of spongio-piline laid over the vesicated surface; also the application of iodine.

In chronic cases, careful regulation of exercise; avoidance

of chills and exposure to cold; great care at the menstrual periods; rest in bed should be insisted on if there be periodical exacerbations of temperature and swellings; no sexual intercourse should be permitted. The patient may be treated with warm hip and iodine baths, applications of iodine externally (iodine pigment, made of iodine ℥i., mastich ℥i., rect. spt. ℥i.), warm compresses, the hot vaginal douche, with laudanum added to the water. A few leeches, when the patient is threatened with recurrence of attacks, may be applied near the anus or in the vaginal region. The bromides, with iodide of potassium, are indicated; and, if sickness occur, such medicines as oxalate of cerium, bismuth, hydrocyanic acid, chloride of calcium, or effervescing mixtures of bicarbonate of soda and potash, may be given. On the whole, some dry champagne, or small doses of brandy, with soda or seltzer water, are perhaps the best stimulants to select. All stimulants are better avoided, or should only be given in very moderate quantities, and abandoned when the occasion for their employment has passed.

Operative Interference for Pelvic Suppurations.

Analyzing the views of Bouilly, Sänger, and Howard Kelly at the Geneva Medical Congress (September, 1896) on the treatment of pelvic suppurations, we find the first-named authority classifying the indications for operative interference as follows:

(*a*) Cellular abseesses, perimetritis, peri-uterine phlegmons.
(*b*) Abseesses of the ovaries or the tubes, pyosalpingitis and suppurating ovaritis.
(*c*) Primitive peritoneal abscesses, pelviperitonitis, suppurating hæmatocele.
(*d*) Simultaneous suppurations of various pelvie organs constituting purulent eollections, or eomplicated with fistulæ, bursting either through the skin, or in the neighbouring eavities, or in various plaees at the same time.

With regard to treatment, Bouilly divides the three principal methods of treatment thus:

(*a*) Ineision followed by drainage through the abdominal or vaginal wall.
(*b*) The opening or ablation of the suppurated cavities by laparotomy.

(*c*) The opening or ablation of the suppurating cavities through the vagina, by means of previous vaginal hysterectomy with or without morcellation of the uterus.

Howard Kelly, on the other hand, enumerates four principal modes of dealing with pelvic inflammatory disease :

1. Puncture per vaginam.
2. Conservative operative treatment.
3. Simple salpingo-oöphorectomy ; occasionally associated with excision of one cornu uteri.
4. Hystero-salpingo-oöphorectomy.

Sänger gives the following comprehensive classification of all operative procedures :

1. Operations through the vagina.
   - (*a*) Anterior colpocœliotomy (Dührssen, A. Martin, etc.).
   - (*b*) Posterior colpocœliotomy (Atlee, Hégar, Battey, Byford, Laroyenne, L. Landau, Mackenrodt, and others).
   - (*c*) Anterior and posterior colpocœliotomy (Bode, von Erlach, Gotts chalk), all combined with unio- or bilateral salpingo-oöphorectomy.
   - (*d*) Colpohysterectomy (uterine castration of Péan).
   - (*e*) Colpo-hystero-salpingo-oöphorectomy, 'radical operation through the vagina' (Péan, Segond, Doyen, E. Landau).
2. Abdominal operations.
   - (*a*) Uni- or bilateral cœlio-salpingectomy and cœlio-salpingo-oöphorectomy.
   - (*b*) Total cœlio - salpingo - oöphoro - hysterectomy (radical abdominal operation, Krug, Polk, Delagenière, Schauta, Bardenheuer, etc.).
   - (*c*) Bilateral cœlio-salpingo-oöphorectomy combined with supra-vaginal hysterectomy (Zweifel, H.-A. Kelly, Sänger).
3. Abdomino-vaginal hystero-salpingo-oöphorectomy, commenced most often through the vagina, and ended by the abdominal section (L. Landau).
4. Sacral or parasacral cœliotomy (Hégar, von Hochenegg, Czerny, Schede, and others). This operation is performed only by a few surgeons in rare cases.

Bouilly points out that in acute pelvic abscess and primitive peritoneal connections, as also in encysted abscess of the appendages, incision, followed by drainage, frequently cures, and that vaginal punction does not interfere with the subsequent hysterectomy, if such a step be demanded. The unilateral or bilateral character of the adhesions, the height in the pelvis to which the purulent collection extends, the degree of adhesions of a suppurating sac to the uterus, must be the principal guides to the choice of one of the two steps,

cœliotomy or vaginal hysterectomy. The major operation has the advantage of being more radical in character, and provides more perfect drainage, while the utero-adnexal castration affords the most complete protection against any associated subsequent complications.

Howard Kelly points out the low mortality of the treatment by puncture through the vagina, and the freedom from the dangers and risks inseparable from the major operations. The dictum of so fearless and experienced a surgeon is worthy of note :

'*In young married or unmarried women, in the case of girls who have not come to maturity, even seriously diseased organs should not be removed, until every other means of cure has failed.*'

As I have already emphasized in the text, no possible precaution must be overlooked both before, during, and after operation, regarding asepsis of the vagina.

The rectum, bladder, uterine arteries, and ureters have to be carefully avoided. Provided the peritoneal cavity has not been opened, he irrigates the abscess cavity with sterilized salt solution, and gauze, rubber, or silver tubing are the means used.

In simple pyo-salpinx, with or without purulent foci in cornu-uteri, Kelly advises salpingo-oöphorectomy, and excision of the affected portion of the uterus, and hystero-salpingo-oöphorectomy in cases in which, as we have shown, Bouilly advises it. In this operation Kelly drains through the cervical stump, a piece of gauze being pushed from the abdomen through the dilated cervix into the vagina, the perinæum being brought over the stump by continuous catgut sutures. On the question of drainage, Sänger gives the following indications for its indispensable employment :

(*a*) Every time that virulent pus has contaminated the operator's hand or the unimpaired part of the abdomen.

(*b*) Every time that the hæmostasis is not perfect, especially when there is a discharge of virulent pus.

(*c*) In the case of the existence of a fistula before the operation, or of perforation of the intestine happening during the operation, or likely to happen afterwards. Every time also when fistulæ or perforations have been closed by the suture.

Sänger lays down the rule that cœliotomy is always indicated in large purulent collections and in suppurative cystic neoplasms, and the concert of opinion of German gynæcologists is distinctly in favour of ablation of all suppurated organs. The divergence of opinion exists as between the radical operation through the vagina, and abdominal salpingo-oöphorectomy or hystero-salpingo-oöphorectomy. There is the further difference of operation by means of forceps or by ligature, equally eminent authorities being ranged as advocates on either side. Sänger, from November, 1893, to September, 1896, had operated forty-four times by vaginal hysterectomy and hystero-salpingo-oöphorectomy, and thirty six times by the abdomen, without a single death. After contrasting the vaginal and abdominal operations, Sänger makes these remarks :

The vaginal operation, perhaps less radical than the abdominal, is, however, infinitely simpler and far less dangerous in its execution ; it must be considered as the one to be selected.

Every time that preservation is not indicated, the supra-vaginal cœlio-salpingo-oöphoro-hysterectomy will be the least dangerous radical operation.

It can even be performed while preserving parts of the ovaries (Zweifel).

In considering the cases in which a radical operation is indispensable, he prefers the abdominal method, and finally concludes :

Advocates of the different operatory methods should avoid claiming an absolute superiority for their own proceeding. Every appropriate treatment may be justified, and in each individual case it is far better to take into serious consideration the special advantages offered by each one of the methods.

In regard to the question whether the sero-purulent fluid should be evacuated or not, if the patient be suffering from the collection, and not progressing favourably, its removal should be accomplished.

Leopold, in advocating hystero-salpingo-oöphorectomy in chronic suppurative conditions of the annexa, with associated diseased states of the uterus (an operation which he had performed thirty-seven times in nine years), refers to the conditions that indicate this radical step :

(*a*) Where the patient is deprived of all enjoyment in life and capacity for work. (*b*) Where all ordinary and extraordinary therapeutic measures have failed. (*c*) When the pathological conditions include such states as the following: A retroflexed and adherent uterus, enlarged by chronic metritis and endometritis. Muco-purulent discharge from the uterus, or possibly periodical severe metrorrhagia. Salpingitis and pyo-salpinx, and diseased conditions of the ovaries. Such states are easily determined by a thorough examination.

Leopold thus enumerates the advantages of total extirpation by the vagina :— (1) The complete removal of the diseased organs, without leaving behind a still inflamed uterus as a focus of further mischief. (2) The wound is at the lowest part of the abdominal cavity, favouring drainage. (3) The operation field is readily accessible, even in the case of non-parous women, and in cases of large swellings of the appendages. (4) There is no abdominal wound, and the risk of ventral hernia is obviated. (5) The operation is much less dangerous than laparotomy; the intestines do not come into view; the soiling of intestines with pus is prevented, the operation is practically extra-peritoneal, and lastly, it is available for patients in such a weak condition that laparotomy would almost certainly prove fatal.

PERI-UTERINE PHLEGMON (PARAMETRITIS).—By the term 'parametritis' we mean a phlegmonous inflammation of the connective tissue of the pelvis.

Causation.—It occurs often in association with the puerperal states as the result of septic absorption. The proportion of cases of peri-uterine inflammation due to child-bearing, miscarriage, abortion, both criminal and other, is understated if we place these affections as furnishing over 50 per cent. of the causes.

It may also be due to traumatic causes, as operations on the uterus; the use of tents, intra-uterine stems, and medication; or follow upon ovaritis. In a table of 146 cases, Emmet showed that 50 per cent. were complicated with versions or flexions, and over 17 with laceration of the cervix, the next most frequent association being a fibroid tumour of the uterus.

Pathological Anatomy.—The extensive distribution and connections of the cellular tissue of the pelvis explain the different positions in which the exudation occurs in parametritis. This may be in the layers of the broad ligaments behind the uterus and rectum, or upwards along the psoas muscle to the kidney or into the iliac fossa, and occasionally extend between the rectum and uterus, the uterus and bladder, and downwards

into the cellular tissue of the gluteal region by the sciatic notch. The ovaries and Fallopian tubes are generally involved.

Matthews Duncan described a form of perimetritis in which remote collections of pus or serum occur in connection with the local inflammation, or after it has subsided, as in a case where the swelling appeared in the neighbourhood of the umbilicus. It is evident from these facts that at the bedside we cannot disassociate parametritis and perimetritis ; it is not conceivable that the peritoneum can escape in a large number of cases of phlegmon of the pelvic cellular tissue.

The stages of the inflammation are the same as those of phlegmon occurring elsewhere—(*a*) congestion, (*b*) effusion, and (if resolution do not happen) (*c*) suppuration. The inflammation may not pass beyond the second stage. With regard to the exudation, there are many degrees of intensity, from a slight swelling in either broad ligament to a considerable infiltration at both sides or in front of the uterus, leaving a hard mass that fills the entire upper part of the pelvis. The uterus is pushed to either side, out of position, or pressed downwards, forwards, or backwards. The effusion at first feels soft to the finger ; it then gradually hardens, and if an abscess form, it again softens, and fluctuation may be detected. Though, in the commencement, the uterus is pushed to the opposite side, later on, when absorption has begun, it is *drawn to the side of the exudation* (Schroeder). This ultimate traction of the uterus to the side of the pelvis in which an old effusion has healed has an important bearing on diagnosis. It also explains the pain which is specially complained of in the contracted region through adhesion of the broad ligament or ovary of that side, and displacements and entanglements of the tubes, or compression of the ovary, especially at the left side, by the laterally drawn uterus against the rectum or pelvic wall. And the bilateral character of the pain is caused by the tension of the broad ligament of the opposite side, and the dragging of the ovary and possible stretching or torsion of the Fallopian tube. These are generally sad cases, for they are difficult to alleviate or remedy.

Diagnosis.—I have tabulated the most reliable points of

distinction between perimetritis and simple phlegmon. (See p. 371.) The diagnostic traits, set down in tabular form, will help to differentiate these effusions from other swellings liable to be mistaken for them. Easy though it may seem to the experienced hand, it is not at all so simple a matter for the young practitioner to diagnose some chronic peri-uterine exudations, especially those situated anteriorly or posteriorly, from fibroid tumours of the uterus. This arises when the tumour cannot be moved apart from the uterus, so that it is difficult to isolate it.

Symptoms and Physical Signs.—Acute phlegmonous inflammation is marked by the following symptoms: rigors, increase of temperature (102-104°), rapid pulse, pain in the hypogastrium, general febrile disturbance, rectal discomfort and constipation; the vagina during this stage is found to be hot and swollen, and there may be vaginal pulsation. Later on careful vaginal and rectal exploration will enable the examiner to detect, in some portion of the vaginal roof, or posteriorly in the utero-rectal space, a small painful swelling, the commencement of exudation.

Later still, the 'board-like' feeling of the induration and the displacement of the uterus and its fixed position leave little room for doubt. The decubitus is more frequently to the affected side (Duncan). There is a very characteristic symptom which occurs also in perimetritis—that is, retraction of the thigh. This happens when the iliac or psoas muscles are involved, and an abscess has formed, or is forming, in the neighbourhood of, or involving, the psoas muscle.

But perhaps the most vital fact for the practitioner to remember is the essentially chronic and insidious nature of the affection in many instances. It is not necessary that the patient should complain of any marked symptom which would attract the medical man's attention specially to the uterus or the pelvic genital organs. I have seen such cases where pelvic mischief was not even suspected, and yet had been for some months taking place. I had such a case, in which dysenteric

symptoms completely masked those of cellulitis, and absorbed the attention of the physician. From the history of the case there had been evidently, in the first instance, endometritis. The patient was unmarried. When I saw her, the uterus was quite fixed by an exudation, which surrounded it, and pressed the uterus back against the rectum, so that it occluded the cul-de-sac of Douglas; this explained the rectal distress.

Pain in walking, a throbbing sensation in the uterus, general loss of health, some nightly rise of temperature or hectic, may be the only symptoms present in these chronic cases. Following on either the acute attack or the chronic form, there is gradual wasting and loss of weight, and, in some instances, emaciation. The patient is worn down by the suffering and the local distress. If the exudation should terminate in suppuration, and an abscess form, relief may rapidly be afforded through its bursting or the evacuation of the pus. Unfortunately, it occasionally happens that the pointing of the abscess is a matter of long duration; the pus burrows in the cellular tissue, and long sinuous channels form, through which it finds its way to the surface, and these render the case extremely protracted. It is not probable that such a disastrous series of complications would be permitted to occur, in the face of our modern operative possibilities, by any surgeon.

Perhaps the exudation hardens, and a large solid tumour occupies some portion of the pelvis, producing both rectal and bladder distress by pressure on these viscera, and exhausting the patient through a slow process of absorption, prolonged over many months of unrest and suffering. If an abscess form, it may point in the rectum, vagina, or abdominal wall. Take two such examples as the following:

A woman was admitted into hospital under my care with an exudation boarding up the entire roof of the vagina anteriorly, and producing great vesical distress. Shortly after admission, a quantity of pus suddenly appeared in the urine, and this continued for a considerable time; the pelvic hardness finally disappeared, and there was no vesical trouble.

I was called some years since to see a lady, exhausted from prolonged suffering from what I judged to be an attack of peri-uterine cellulitis with perimetritis. The patient was so weak that she fainted at the first attempt at a

digital examination. She had not for many weeks had rest, save by the aid of bromide of potassium and chloral. I found a large tumour completely fixing the uterus. There was a slight uterine discharge. When the bowels were relieved, the greatest agony was suffered. There was limited peritonitis, with exudation, which could be traced almost to a level of the iliac crests. On the following day a speculum was introduced, as she complained of considerable pain during the night, and a flow of fœtid discharge. I found a quantity of discoloured pus in the vagina; and on clearing this away, I saw that it was flowing rather profusely from the os uteri. For five weeks this purulent discharge continued, and it lasted, in smaller quantity, for ten weeks from the time I first saw her. She recovered; all hardness completely disappeared, and the uterus was quite normal in mobility. (Since this was first written she has been twice married.) But this happy termination of such an extremely grave case is not the rule.

In addition to the immediate dangers, from the inflammation involving the peritoneum and causing general peritonitis, or the more remote risks that are inseparable from the presence of pus and the bursting of a pelvic abscess, there are the ultimate results, such as adhesions, atrophy of the ovary, occlusion of the Fallopian tube, sterility, uterine displacements, with amenorrhœa and dysmenorrhœa. Parametritis is not an affection in which we have so much to fear fatal consequences, as these chronic pathological and clinical sequelæ.

Treatment.—Most of what has been said regarding the treatment of perimetritis refers with equal force to peri-uterine phlegmon. Rest in every way that it can be secured, and that for a considerable time; opium in the acute stages, and the regulation of the temperature by the application of ice, or Leiter's irrigator (Fig. 312), which can be applied both externally and in the vagina. The hot vaginal douche, with a disinfectant in the water, used three or four times daily, will be of service. Warm compresses and thin cataplasms externally, and the liquor epispasticus applied over the hypogastrium, benefit. The patient's strength must be sustained with a light and nutritious diet. In the chronic stages the iodides of potassium, strontium, or sodium, combined with bromides and tonics, may be given. I am inclined, in these cases of old and unabsorbed effusion, to place the patient on a course of perchloride of mercury and bark, or a pill containing percyanide of mercury (gr. $\frac{1}{12}$), quinine (gr. ii.), extract of gentian and

bread-crumb (q.s.); one pill three times daily. If we except the plan of Apostoli of treating parametritis by electrolysis, nothing of material importance has been lately added to our methods of treating the earlier stages of this affection, and the general principles advocated in the text are those by which we must be guided. I may summarize the most important methods.

The various operative procedures that have been referred to in treating of pelvic suppurations are those to be adopted in suppurating pelvic phlegmon.

(*a*) Apostoli's treatment by electrolysis (*vide* chapter on Gynæcological Electro-Therapeutics).

(*b*) The constant and free use of the hot douche, to favour resolution and promote absorption.

(*c*) The value of antipyrin, antifebrin, and phenacetin as antipyretics, in the acute stage.

(*d*) The careful curetting of the uterus, after dilatation, with antiseptic drainage, in endometritis, in the chronic stages of the disease (Poullet).

(*e*) The internal administration of perchloride of mercury in the chronic stages ; the value of this treatment was pointed out in the first edition of this work.

(*f*) The early evacuation of the serous fluid by the aspirator (Hardon); this is done by inserting the aspirating needle to the depth of half an inch in several points, avoiding pulsating vessels and taking careful antiseptic precautions.

(*g*) Early evacuation of the pus. Hunter recommends a branched uterine dilator to enlarge the wound, and admit the finger, so as to explore, and break down any septa that may divide the pus cavities.

I must say a word of caution regarding the rectum. I could cite cases in which both serious consequences to the patient, and unfortunate errors of diagnosis, have resulted from overlooking concretions in the large intestine and rectum when there were perimetritic exudations also present. Gaillard Thomas draws particular attention to this important fact. *I would warn all practitioners to explore the rectum and carefully palpate the colon in every case where a doubt exists as to the nature of an obscure abdominal swelling.*

PELVIC PHLEGMON.	PERIMETRITIS.	PELVIC HÆMORRHAGE.	FIBROUS TUMOURS.
Connected more frequently with abortion; parturition; operations on the uterus; septic causes.	Coming from similar causes, but often also from imprudence during menstruation; from ovaritis and escape of fluid into the peritoneal cavity; gonorrhœa is a frequent cause.	Caused by some irregularity of menstruation; traumatic causes; atresic conditions of uterus, vagina, or vulva. Most frequent cause ectopic gestation.	The characteristic, slow, and more uniform growth, and the history of local pelvic distress.
Acute febrile symptoms—may be slight and unnoticed.	Acute febrile symptoms more severe; nausea, vomiting, tenderness, tympanites, more likely to be present.	Sudden appearance; signs of hæmorrhage; occurs without preceding symptoms of inflammation. Symptoms of peritonitis follow.	Febrile symptoms absent. History of menorrhagia and metrorrhagia.
Hardness is more likely to be lateral.	Hardness posteriorly or anteriorly.	Hardness may be felt in either cul-de-sac displacing the uterus, more generally in Douglas' space.	Distinctly uterine.
Swelling easily reached from the vagina; soft and doughy at first, then becoming hard; softening again if pus should form.	Swelling generally retro-uterine; if lateral, likely to be out of reach of the finger.	Swelling more frequently found in the posterior cul-de-sac or in Douglas' space.	Swelling incorporated with the uterus, and moving with it; tumour hard from the first and round; characteristic feel of cervix.
Pain present. Not so painful as perimetritis.	More painful, pain usually previous to swelling.	Pain follows the formation of the swelling.	Not sensitive; pain may be altogether absent.
Retraction of the thigh.	Retraction of both thighs.		
Uterus becomes less movable; displaced laterally, or is fixed.	Uterus less movable; frequently fixed.	Uterus displaced according to the site of the hæmatocele.	Uterus generally movable.
Swelling not so diffused.	Swelling diffused; hard at first, gradually softening.	Swelling soft at first; gradually becomes hard.	

CHAPTER XVIII.

PELVIC HÆMORRHAGE.

PELVIC HÆMATOCELE was a term applied originally by McClintock to a collection of blood, which is either *enclosed* in the peritoneum behind the uterus, in Douglas' pouch—*retro-hæmatocele* (Nélaton); or in front of the uterus (com-

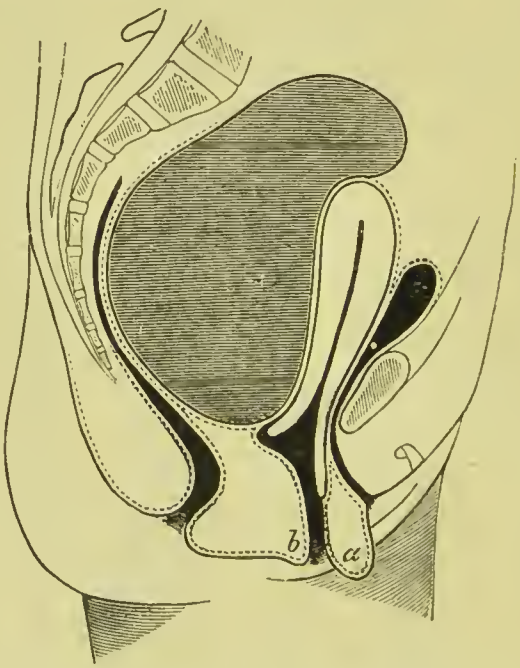


FIG. 261.—Retro-hæmatocele (Schroeder).

paratively rare); between it and the bladder—*ante-hæmatocele*. The blood may escape posteriorly or anteriorly into the cellular tissue, forming a thrombus or hæmatoma, by some styled *sub-peritoneal hæmatocele*. If it escaped into the peritoneum, it

was called *intra-peritoneal*. It is certain that the term 'pelvic hæmatocele' has created considerable confusion in the minds both of students and practitioners. This has arisen in consequence of its wide application to any collection of intra-pelvic escape of blood, whether intra-peritoneal or otherwise. It is true that blood does occasionally escape from causes other than those directly associated with conception. Thus, the bleeding may occur as a consequence of pernicious anæmic states, purpura, malignant jaundice, and during the zymotic fevers. It may happen coincidently with suppression of menstruation from such causes as mental shock, exposure to cold, and coitus. It may be the direct result of such disease in the ovary or Fallopian tube as may lead to the rupture of either. Traumatism is the cause of the bleeding after operations on the annexa and uterus, or such direct violence as a blow, a kick, a fall, forcible dilatation of the uterus, and violent coitus. It may be associated with atresic conditions anywhere from the vulva to the Fallopian tubes. Virchow and Schroeder assign perimetritis and peri-uterine phlegmon as a cause, though these inflammatory conditions must be regarded rather as a consequence than as source of the hæmorrhage. But when we come to investigate the origin of the hæmorrhage, we find in the great proportion of cases that it is directly due to causes immediately connected with pregnancy. Of these latter, by far the larger number are the result of tubal fœtation. Next in frequency is abortion, and in some rare cases the loss has been brought about by rupture of the uterus in early pregnancy. It is questionable, therefore, if the expression 'pelvic hæmorrhage' should not be substituted for that of 'pelvic hæmatocele,' though we may retain the term pelvic hæmatoma to express the fact that the blood has escaped into the cellular tissue of the pelvis. We may, then, thus divide the causes of pelvic hæmorrhage into two principal groups—(*a*) that connected with pregnancy, by far the most numerous; and (*b*) miscellaneous.

CAUSES OF PELVIC HÆMORRHAGE.

(*a*) *Connected with Pregnancy :*

Ectopic gestation.
Abortion.
Molar pregnancy.
Rupture of uterus (*in early gestation*).

(*b*) *Miscellaneous :*

Menstrual suppression from	Mental shock. Cold. Coitus.
Disease in the ovary or Fallopian tube, leading to	Rupture of ovary and Fallopian tube.
Traumatic	After operations, as ovariotomy; flow from the pedicle (Wells). Blows, kicks, falls, some overstrain, the use of tents; excessive coitus.
Perimetritis and parametritis ...	(Virchow and Schroeder.)
Abnormal blood-states	Anæmia. Plethora. Purpura. Zymotic diseases. Jaundice.
Obstruction to the flow of blood, menstrual or other (as in atresia), in the	Fallopian tubes. Uterus. Vagina. Vulva.

Hæmatocele is more likely to occur during the active period of menstrual life; but I have known a case in which a considerable escape of blood occurred from a fall off a chair, in a patient over sixty. I have on one occasion seen a large pelvic hæmatocele form suddenly in a severe case of typhus fever.

Symptoms and Physical Signs.—There may or may not have been some previous hæmorrhage, or a suspicion of it. The symptoms in the relative order, and as they usually occur, are —shock, tendency to collapse, great pelvic pain, syncope, sense of weight and pressure in the pelvis, vomiting, fall in

temperature, rapid and weak pulse. These symptoms may persist, and death may ensue, despite every effort to rouse the patient. They are all intensified in the intra-peritoneal variety. Their severity will in great measure depend on the quantity of blood which is effused into the peritoneal cavity. When reaction sets in (within forty-eight hours), the patient may suffer from rigors; the temperature rises, the skin becomes hot, the pulse changes in character. Menorrhagia may increase or persist.

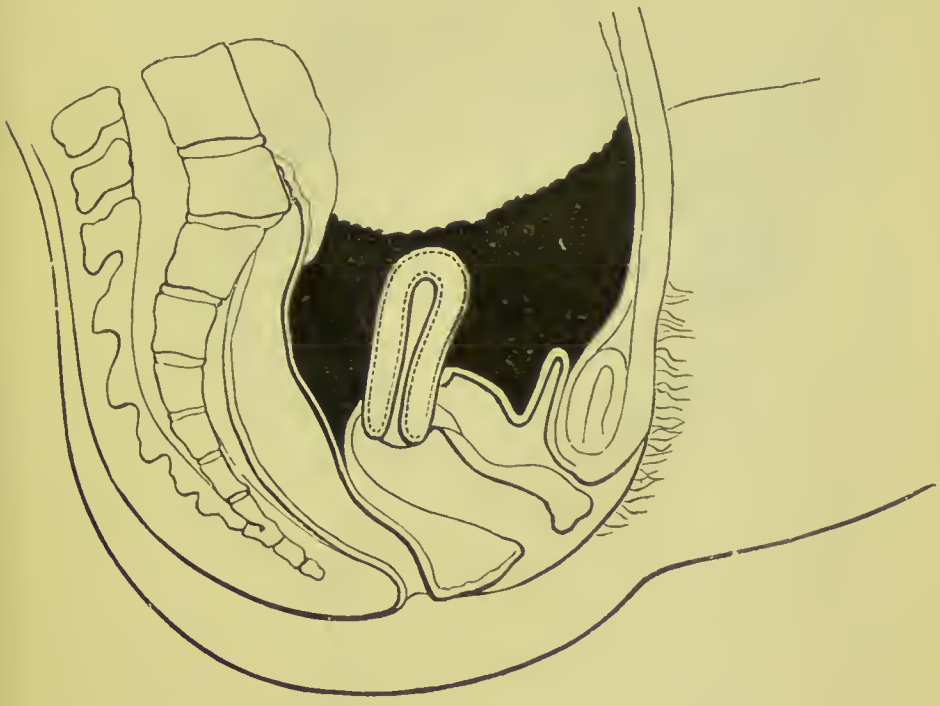


FIG. 262.—Hæmatocele in the Peritoneum, after Emmet.

On examination, the abdomen is frequently found tense; there is abdominal swelling, and dulness is detected, especially over the hypogastric and inguinal regions. The abdomen is tender on palpation. On vaginal examination, a mass is found generally posterior to the uterus—rarely anterior; it is smooth, soft at first, and has a semi-fluctuating feeling. The uterus is pushed forwards against the bladder in retro-uterine hæmorrhage; backwards against the rectum when the blood escapes anteriorly. The bladder is generally encroached on, and retention of urine

may result, or dysuria. The rectum is compressed. There is either difficulty in defæcation, or rectal irritation may be present with tenesmus and dysenteric symptoms. As the case proceeds, the uterus becomes more fixed, and the mass is harder. The further symptoms and local signs depend on the course of the effusion, whether absorption occur or hardening of the mass. If suppuration follow, the pus finds an exit through the rectum

FIG. 263.—Retro-uterine Hæmatocele (St. Thomas's Museum) from a Diseased Ovary. It was bounded above by plastic effusions and the small intestine (Robert Barnes).

or vagina. It may escape, though rarely, into the peritoneal cavity. On the other hand, it slowly disappears without involving these viscera. Should suppuration take place, we have to dread the danger of peritonitis, septic absorption, and septicæmia.

As illustrative of the fact that cases in which a considerable escape of blood into the meso-metrium, the result of tubal pregnancy, may get well without interference, I may mention

a case I saw with Dr. Threadgale, of Brondesbury, in which, in a presumable pregnancy of the second month, an effusion reaching to within a few inches of the umbilicus was reduced to a mere perimetric hardness. The local treatment consisted mainly in hot antiseptic vaginal douches, and Leiter's abdominal irrigator externally with iced water.

Several years since, in Ireland, I had a remarkable case under my observation for nearly three years. I was telegraphed for from a distance to see a young married woman shortly after the acute symptoms set in. She had a typical conoidal cervix. She was then in acute pain. The bladder was pressed against by the uterus, which was pushed upwards and forwards, so that it was impossible to reach the cervix with the finger; there was retention of urine, and with the greatest difficulty the rectum was occasionally emptied by enema. She was dangerously ill from the protracted pain and distress, caused by the pressure on the pelvic nerves and viscera. This swelling gradually disappeared, and when I last saw her the bowel and bladder acted in quite a healthy manner, and the uterus had fairly regained its mobility, though not entirely. I cite this case merely to show how protracted such a recovery may be.

Diagnosis of Pelvic Hæmorrhage.—This is not in some old-standing cases at all so simple a matter as at first sight it may seem. We have to differentiate a pelvic effusion from a retroverted uterus; a perimetric exudation; a uterine fibroid; a tumour or cystic formation in the pouch of Douglas, or in the broad ligament.

We must rely in diagnosis on these proofs:

The history of the case—the previous evidence of conception having occurred, the suppression of menstruation, the occurrence of some accident or operation, the presence of a zymotic disease or pernicious anæmia, an atresic uterus or vagina.

The suddenness in the accession, and the severity, of the symptoms.

The occurrence of hæmorrhage.

The position of the tumour posterior to (as a rule), and not at the sides of, the uterus.

The mode of formation of the tumour; its painful nature; its rapid development; its softness in the first instance, and the subsequent hardness, accompanied by shrinking of the tumour.

The position and size of the uterus, determined bimanually and by the uterine sound; the independent mobility of the uterus; the appearance of pus, and the associated reduction in the size of the tumour.

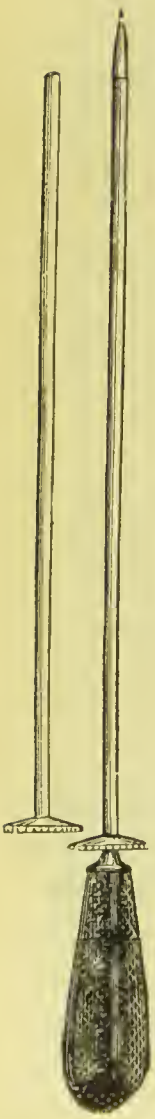


FIG. 264.—Exploring Trocar and Cannula. (See pp. 118-120.)

Prognosis.—This must always be grave—much more so in the intra-peritoneal than the sub-peritoneal effusion. There is the danger of exhaustion from recurring hæmorrhage; the pain of pressure, septicæmia, and peritonitis.

Treatment.—Absolute rest; ice over the hypogastrium; ergot given internally, and, better still, by means of the subcutaneous injection of ergotine (gr. iii. to gr. v.) into the gluteal region; opium later on during the period of reaction, both by the mouth and by the rectum (enema and suppository); quinine with digitalis; stimulants, to prevent syncope (iced champagne and brandy are perhaps the best). I have already entered into the question of evacuation of the fluid, and, in order to avoid repetition, must refer the reader to the chapter in which this is discussed (*vide* pp. 121-123).

Once the escape of blood into the pelvic cavity is decided upon, and that there is a possible tubal pregnancy as a cause, all modern teaching is in the direction of cœliotomy. The friends must at once be warned of the probability of such an operation being required. So grave a step will depend on the presence of such constitutional symptoms as persistent or variable high tempera-

ture, rapidity of pulse, sickness, attended by local pain, and increase in swelling. (See chapter on Tubal Pregnancy.)

This case of pelvic hæmorrhage I regard of sufficient clinical interest to record. It is typical of its kind, and is instructive.

A married woman aged thirty-eight years had had four pregnancies, and one miscarriage. The youngest child was aged fifteen months. The catamenia were regular after the birth of this child. The patient had menstruated during previous pregnancies for several months. During the last pregnancy the catamenia continued for nine months. A menstrual period commenced on April 5th, the regular time, but did not terminate as usual, and there was a constant show for two weeks, during which period she complained of violent pain in the left iliac region, with constant nausea and attacks of faintness, and with pain in defæcation. On May 6th she was admitted into Stanmore Cottage Hospital complaining of pain, especially over the left side. There was a swelling in the left inguinal and hypogastric regions, and still some hæmorrhagic discharge from the uterus, the bowels moving with difficulty. I saw her in consultation with Dr. Hamilton Allen on May 14th, and found the condition of things as mentioned. There was then considerable fulness in the left fornix. The os uteri was patulous, and there was sanious discharge from it. It was decided to dilate the uterus and explore the cavity. This was done with a negative result. At the same time the friends were told that an operation would in all probability be necessary. I saw her again on the 19th, and decided that if there were any change for the worse abdominal section should be performed. From the 20th to the 22nd pain and distension increased, and the temperature range, which previously had been nearly normal, varied from 100° to 102°. The bowels could not be moved by enema. On the 23rd she was operated upon. On opening the abdomen, a large sac, extending above the umbilicus, was discovered. To the anterior surface of this the bowel was adherent in parts, and also the omentum. It was firmly fixed posteriorly and quite impossible to separate. On tapping the sac, after careful protection of the bowel with sponges, it was found to contain semi-coagulated blood. The sac wall was, therefore, freely opened and the contents turned out. The edges were pared and the sac was stitched by interrupted fishing-gut sutures all round to the peritoneum, which was then brought together and sutured, leaving sufficient space for a drainage-tube. The abdomen was closed by three sets of sutures, and a drainage-tube left in. The temperature remained normal after the operation, and the tube was removed on June 1st. The patient made an uninterrupted recovery. My first impression on seeing this case was that it was one of extra-uterine fœtation, the date of which could not be determined from the previous history. I thought also that there might have been pelvic hæmorrhage caused by the rupture of hæmato-salpinx, or possibly due to an early miscarriage. I certainly was astonished on seeing the size of the sac, the thickness of its walls, and the extent of the adhesions. The contents were afterwards carefully examined for the presence of a mole, but such could not be found. No tube or ovary could be detected on the left side. There had evidently been recurrences of hæmorrhage, and a recent bleeding within the few days

prior to the operation explained the symptoms from which she suffered and the sudden increase in the size of the swelling.

Bland Sutton successfully operated upon a case of intra-peritoneal hæmatocele, the result of a rupture of a cyst of the left ovary, the blood being caught in a fold of adherent omentum and becoming encysted. The uterine appendages of both sides were removed, and, as either incidental to the operation or occurring immediately before it, a cyst in the right ovary had likewise ruptured, and blood had escaped into Douglas' pouch. The possibility of such ruptures of ovarian and tubal cysts happening suddenly has to be remembered. I have myself on three occasions recently removed large-size blood-cysts from the parovarium and tube. The contents of such cysts cannot be diagnosed save by operation, or aspiration through the vagina, a step not devoid of risk.

In other cases than those in which the hæmorrhage is the consequence of gestation, my experience of pelvic "hæmatocele" would lead me to advise the surgeon not to interfere hastily with any collection of blood or coagulum unless there should be persistent evidence of the presence of fluid, or that symptoms supervene which are due to interference with the bowel and bladder from pressure, or point to the advent of septicæmia. The aspirating-needle is used both for the purpose of exploration and also for the evacuation of pus. Should this not answer, and the fluid reaccumulate, the guarded bistoury must be used, and the cavity be subsequently washed out with some weak biniodide ($\frac{1}{5000}$) or bichloride of mercury ($\frac{1}{5000}$) solutions. It is a question if this be not the safest method of punction of a purulent intra-peritoneal collection of pus, and then to tampon the vagina well with iodoform gauze.*

In extra-peritoneal hæmatocele, the value of a branch steel dilator to enlarge the vaginal opening and admit the finger and drainage-tube has been urged (Powell, Gusserow, and others). The use of Paquelin's thermo-cautery knife in opening the vagina was well illustrated in a case of John Phillips', brought before the Obstetrical Society of London; the clots were removed, and a Keith's drainage-tube was used. The value of iodoform gauze as a vaginal dressing in these cases cannot be too forcibly insisted on.

* See pp. 121-123.

CHAPTER XIX.

UTERINE NEOPLASMS. POLYPUS UTERI.

THOUGH uterine polypi should rightly be included in the description of uterine neoplasms, I devote a separate chapter to their consideration. A uterine polypus is a sufficiently characteristic growth to warrant a distinct study.

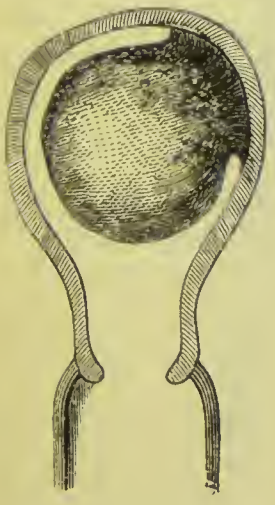


FIG. 265.
Submucous Fibroid.

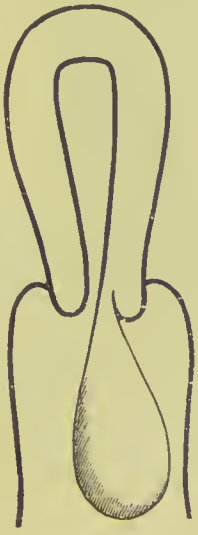


FIG. 266.
Outline Diagram of Polypus of Cervix (adapted from Thomas).

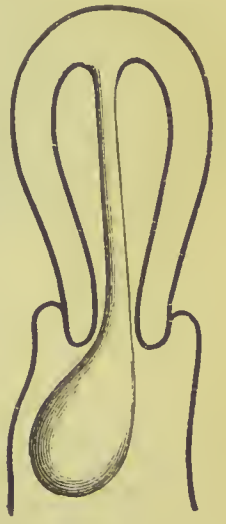


FIG. 267.
Outline Diagram of Polypus with long pedicle attached to the summit of the uterine cavity; the cervical canal contracted on pedicle (this may lead to partial inversion).

Polypi we may classify according to the elementary tissues from which they take their origin—cellular, glandular, fibrous, lacental.

The first variety, springing from the cervix, consists principally of cellular tissue and mucous membrane; the second (also arising from the cervix) of hypertrophied follicles and connective tissue; the third of muscular and connective-tissue elements, the former preponderating. Placental polypi have their origin in portions of placenta that have been left in utero,

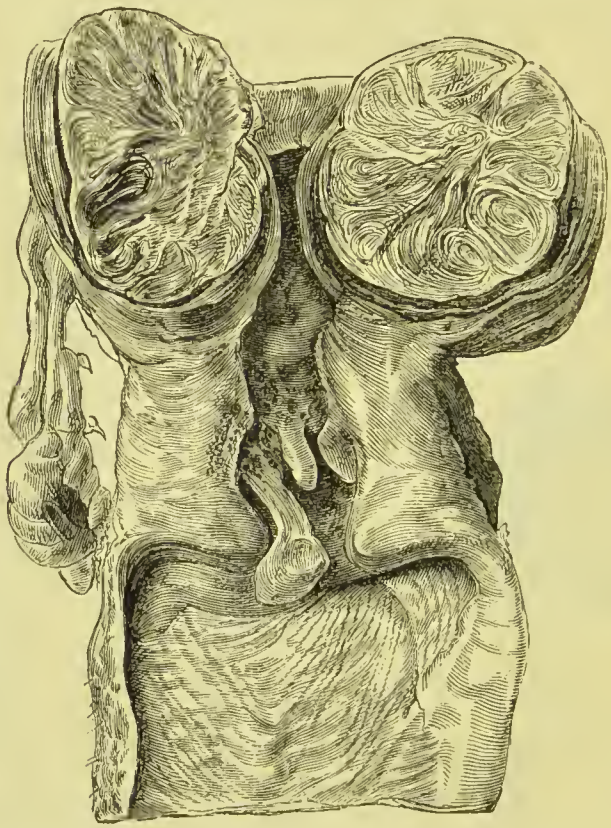


FIG. 268.—Fibroid Tumour of the Uterus, showing encapsulation in the uterine parenchyma, and the attendant development of cystic polypi in the cervix. Two-thirds natural size (St. Thomas's Hospital, Robert Barnes).

and which, becoming organized and incorporated with the uterus, form polypi.

Fibroid polypi spring from the body of the uterus, and are at one period of their growth submucous fibroids. They assume the form of polypi through extension into the uterine cavity, and by the gradual narrowing of the base of attachment into a pedicle.*

* See p. 346, Figs. 253, 254.

Diagnosis.—This will depend on the size and position of the polypus. Whenever obscure menorrhagia or metrorrhagia occurs or persists, especially if the discharge continue foul and offensive, and we are suspicious of polypus, there is but one safe rule, which is, to dilate and explore the uterus, and not to persevere with palliative treatment.

Dysmenorrhœa and Menorrhagia.—It must be remembered that a small polypus may be concealed in utero and cause severe dysmenorrhœa without the occurrence of menorrhagia or any perceptible uterine enlargement.

We may be further guided to the suspicion of polypus if there be some enlargement of the uterus and congestion; and if the fundus should feel enlarged, and the cervix dilated.

Importance of Full Dilatation.—The first step towards the diagnosis and treatment of polypus is dilatation of the cervix. The facility with which we can feel the growth will depend on its size and position. At times this is comparatively easy; occasionally it is very difficult. A large extra-uterine polypus is felt at once with the finger. The principal danger is that we may confound it with inversion of the uterus. We are not so likely to mistake it for prolapse.

Recently a curious case, showing how one may be mistaken if the uterus be not dilated, occurred to me:

Retrocession of the Polypus.—A lady, in whom pregnancy was diagnosed, consulted me to verify the opinion. On examination, I was surprised to find a bleeding fibroid polypus protruding from the uterus. I advised its removal. She had severe hæmorrhage the next few days, and operation had to be unavoidably postponed. When placed under ether, which the patient insisted on having, to my surprise there was no polypus visible. I passed a uterine sound into the cavity, and as far as I could judge it moved freely in utero. I could discover no growth. I came to the conclusion that the polypus had become detached during the hæmorrhage of the preceding days. A week subsequently there was a return of bleeding and some watery discharge. On examination, I again saw the polypus appearing at the os uteri. I removed it the following day, and found the pedicle attached above the internal cervix. It would appear that on the previous occasion, under the influence of ether, the growth had returned into the cavity of the uterus and so passed out of sight.

Intra-uterine Fibroid as a Source of Dysmenorrhœa and Metrorrhagia.—In February, 1895, I exhibited an intra-uterine

polypus at the Gynæcological Society, removed from a patient aged 32, recently married, in whom the loss of blood and aggravated dysmenorrhœa had brought about a most serious anæmic condition. The year before I saw her, and previous to her marriage, the uterus had been dilated and curetted by a distinguished obstetrician. The submucous tumour was the size of a small pear. I discovered the intra-uterine growth when proceeding to divide the cervix (under an anæsthetic), as from the recent curettage I did not suspect its presence. The annexa were healthy. Evidently the curette had passed round the growth, and the imperfect dilatation had not revealed it. The case was one showing the value of anæsthesia in diagnosis, and the importance of sufficient dilatation and exploration in dysmenorrhœa and metrorrhagia.

The following case needs no comment to show the necessity for great care in the diagnosis of intra-uterine growths :

'Fancourt Barnes showed (at the British Gynæcological Society) the appendages removed from a patient, æt. 30, on whom he had operated on account of excessive metrorrhagia. The loss of blood had been so severe and reiterated that the patient was rendered extremely anæmic, pulseless, and almost moribund. Intra-uterine medication had afforded some relief for a time, but the hæmorrhage had returned and ignipuncture was tried with a like result. She was ultimately admitted to the Chelsea Hospital for Women, where he removed the tubes and ovaries. The left ovary was cystic and adherent, but the right was free. For some months afterwards there was no bleeding, but again the hæmorrhage recurred, and two months ago she again took to her bed. Tait saw her, and concurred in the view that it would be well to curette the uterus. It was dilated for this purpose, with the result of revealing the presence of a small sessile fibroid growth, which was removed with the scissors.'

We may thus tabulate the positive and negative signs of uterine polypus :

Positive.—A tumour which has slowly increased in size, pyriform in shape, having a narrow neck or pedicle, insensible to touch, not painful when punctured, and varying in size.

Hæmorrhage is a constant accompaniment of polypus, and there may be a foul sanious discharge.

If the tumour be in utero, the sound passes into the uterus from two and a half inches upwards, the cavity of the uterus being enlarged to accommodate the growth; if in the vagina,

we can trace the pedicle of the polypus to the cervix, and the uterine sound passes above this, inside the cervix, for over two and a half inches.

There is no opening at the dependent portion of the tumour; the encircling ring of the cervix is traced below it or around the pedicle, and the uterine sound can be passed inside the cervix, between the wall of the uterus and the tumour.

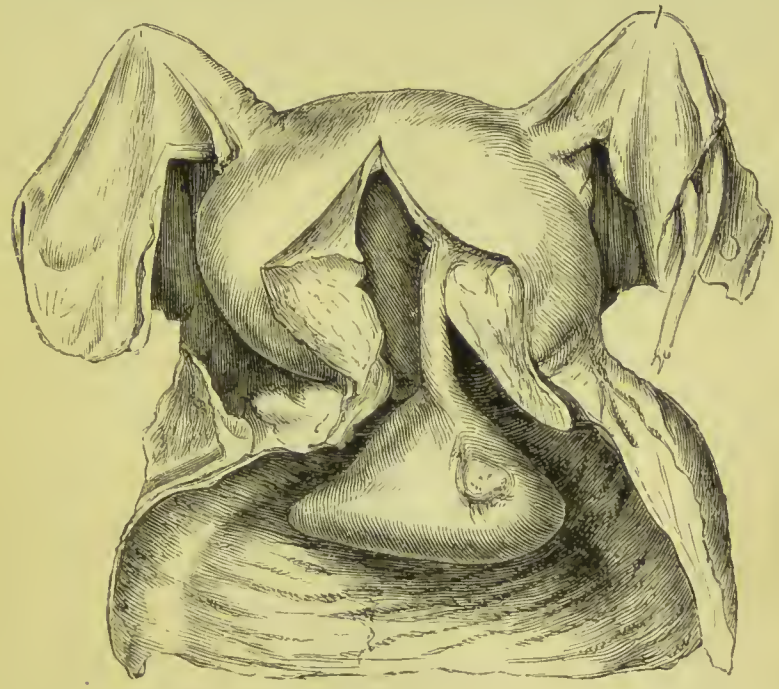


FIG. 269.—Fibroid Polypus which has been extruded from the Uterine Cavity and retains its shape. Half size (College of Surgeons, Robert Barnes).

These points are specially to be remembered in diagnosing polypus from inversion of the uterus.

By careful conjoined examination the fundus can be felt in position, and has no marked depression. Thus the size and consistency of a polypus may be estimated: it may occur in nulliparous women and virgins.

IMPORTANT NEGATIVE SIGNS.—Absence of os uteri; absence of sensitiveness, and commonly freedom from pain.

Symptomatology.—The principal symptoms are: Hæmorrhage, uterine pain, vesical and rectal distress (dependent upon the

size of the polypus and its position); dragging pain in the back, and perhaps difficulty in walking if the polypus be large; occasionally, dysmenorrhœa.

Treatment.—Before removing a large polypus it may be necessary to restore the patient's general health, shattered by the long-continued strain and loss of blood. This is done by preliminary rest, the use of astringents locally, and dilatation of the cervix by means of the larger bougies, tents, or Barnes' dilator.

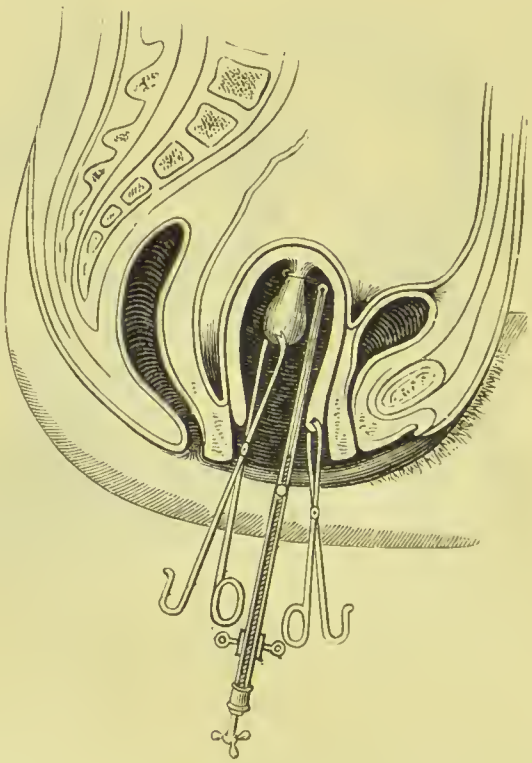


FIG. 270.—Removal of Polypus by écraseur and vulsellum (after a diagram by Atthill).

Treatment.—The treatment for polypus is removal. We may remove a polypus by means of the écraseur, the galvanic cautery wire, the polyptome, or hysterotomy. Small polypi may be twisted. In a case under my care, in examining a polypus, and passing my fingers to the cervix uteri, I felt an extremely narrow pedicle. By twisting the mass, which was about the size of an orange, with my fingers, it came away in my hand.

We require for removal of polypi an écraseur, a vulsellum, a tenaculum, and a polyptome, if the polypus be large. Lombe Atthill uses, in some cases, small cannulæ for securing the wire on the pedicle of the polypus.

Atthill thus describes his method of employing the cannulæ:

'The écraseur differs from an ordinary long wire écraseur only in having the end modified so as to allow of the passage through it of two slender silver tubes identical with those so well known as "Gooch's cannulæ." These, armed with a wire of any strength, can be passed with ease up to the base of any polypus; they are then to be separated, and while one is held firmly, the other is carried round the pedicle. This can always be accomplished when a silk or hempen ligature is used. It is very difficult indeed to carry a stiff wire round a large tumour with them, yet I have done it, and cases from time to time occur in which this method proves useful. Having once got the wire round the tumour, the cannulæ are to be passed through the openings in the extremity of the écraseur; the écraseur is then to be pushed up, guided by the cannulæ, till it comes in contact with the pedicle of the polypus; the cannulæ can then be withdrawn, and the wire being attached to the écraseur, the operation is to be completed as if we were using an ordinary wire écraseur. This is, in point of fact, an adaptation of the cannulæ of Gooch to the écraseur.'

To remove a polypus, if it be intra-uterine, the uterus should be previously dilated. An anæsthetic is as a rule not necessary. The removal is not sufficiently painful or distressing to require it. In the instance of some large polypi in nulliparous women and virgins, it is well, for a few days previous to operating, to distend the vagina with a Barnes' larger-sized hydrostatic bag. The woman is given a dose of bromide of potassium the night before the operation. She is placed in the lithotomy position on a suitable couch or table, and by means of the fingers or a notched director the wire is carried well up to the pedicle of the tumour; after which manœuvre the écraseur having been pushed as far as the neck of the polypus, the wire is gradually tightened. It can be now adjusted to the pedicle, as near as possible to the uterine wall, without injury to the latter. The tumour is then removed by *slowly* tightening the wire and resting at intervals in the usual manner.

Any complaint of pain is an indication of injury to the uterus.

When severed, and loose in the vagina, the tumour may be removed by an ovum forceps. If the polypus be very large, and cannot after its detachment be brought away, or if it

endanger the perinæum and its vessels, it must be divided with a polyptome. Sir J. Y. Simpson devised a cutting-hook for this purpose (Simpson's polyptome). The perinæum has been incised at either side of the median line, in order to enlarge the outlet, so as to facilitate the removal of a large polypus.

FIG. 271.—Routh's Wire-Conductor.

Routh's Wire-Conductors.—The wire conductors consist of two parts; first, an internal solid portion, fixed to a handle; and second, an external hollow tube, which can be moved up or down on the first, but capable of being secured at any point by a pin inferiorly near the handle.

The distal extremities of each part are terminated by a concave end, the concavities facing each other, so that when brought together they constitute an aperture through which the wire may pass, and hang below the handles. Two of these directors together, and so connected, are used. Placed together side by side, they are pushed up to any desired point, armed with the wire, the ends of which should project outside the vagina. One director is now held *in situ*. The other director, carrying the wire along with it, is brought round the tumour to the other side of the first one. Both directors are now held together, and the free ends of the wire, hanging out of the vagina, can be passed through and fixed in the écraseur, which is brought up to the distal end of the wire-directors.

The pins below the directors are loosened, the outer tube pulled down, and so both wire-directors are liberated from the wire, and may be removed, and the écraseur can act. The directors are generally six in number, with varied curves to meet any irregular projections of the tumours.

AUTHOR'S POLYPTOME (Fig. 272).

Some years since I removed a polypus larger than an average size fœtal skull from the uterus, and in which considerable difficulty was experienced in its extraction from the vagina, in a nulliparous female. I then felt the want of some instrument (which would combine the purpose of forceps and cutting-knife) for the safe removal of these large growths without the necessity of incising the perinæum, or the risk of lacerating it. The application of the écraseur to divide the tumour into segments is tedious, and at times difficult. To meet such difficulties I devised an instrument consisting of a straight forceps, lightly made with slender blades, yet sufficiently strong to compress the tumour. A groove is cut in the lower fourth of these blades, and they are so shaped inside that the edge of a movable knife or saw glides easily along the blade. They lock readily on a revolving pivot, and the same lock carries a short sheath, through which the knife passes. The handle of the forceps is at right angles to the shank, and each half is connected by a rack and pinion-bar. A cutting blade accompanies the forceps, shaped somewhat like a dagger, so as to readily pierce any tumour, and cut from the centre outwards; a second

is a fine saw. These are made of the finest tempered steel. The tumour can thus be grasped and cut through the centre. The blades are either turned round in the vagina, or the forceps may be applied in a different direction, and the mass cut in four or more pieces. These segments may be separately withdrawn. A large and very hard fibroid it is impossible to divide across even with such an instrument. It is better to apply the forceps, and, if there be risk of laceration of the perinæum during extraction, to make two short divergent cuts at each side of the fourchette so as to enlarge the vulvar orifice. After removal of the growth it is well to give a few doses of ergot, and occasionally to wash out the vagina with permanganate of potash or bichloride of mercury solution.

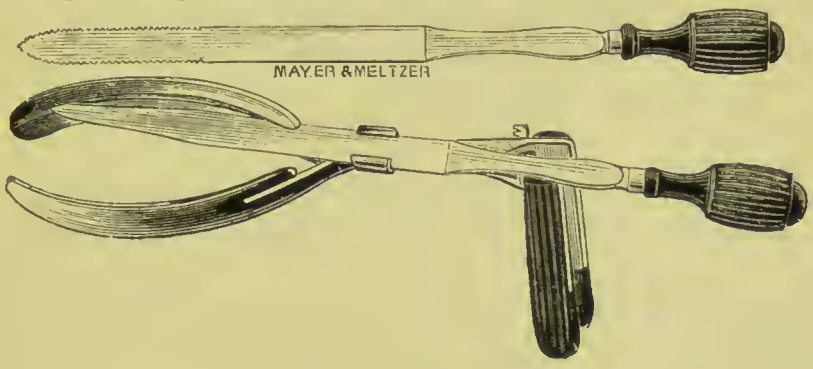


FIG. 272.—Author's Polyptome.

Adhesions of the Polypus to the Vagina.

I exhibited at the Gynæcological Society a large fibroid polypus removed by me. The polypus completely filled the vagina, and was quite as large as a fœtal skull. On passing my fingers into the vagina, the patient being under ether, I was surprised to find the tumour quite adherent to the vaginal wall. The breaking down of the adhesions was attended by the most profuse hæmorrhage, which ceased when the tumour was detached. I had considerable difficulty in getting the wire above the mass. In this case, by drawing the perinæum well back with the duck-bill and using a large vulsellum for delivery, the polypus was removed without injury to the perinæum.

*Hysterotomy.** — Clarence Webster (*Brit. Gyn. Jour.*, February, 1895) quotes a case of Veit's in which he describes a case in which, after dilatation of the cervix, he was unable to remove a polypus. In order to get more access to it, he cut through the attachment of the vagina to the anterior wall of the cervix by means of a transverse incision, and then separated the bladder almost as far up as the isthmus. He next divided the anterior wall of the uterus by a median incision as far up as this point, and was thereafter easily able to remove the polypus. The incision was again closed, and the vagina united to the cervix.

* See p. 293 for details of Veit's operation for submucous myomata.

CHAPTER XX.

UTERINE NEOPLASMS (continued).
FIBROID TUMOURS.

ETIOLOGY, PATHOLOGY, SYMPTOMATOLOGY, ETC.

Etiology.—Uterine fibroids occur frequently in women otherwise perfectly healthy. They often appear when no predisposing or exciting cause can be traced. The period of life has much to say to their occurrence. We may anticipate this relationship if we remember the active influence of ovulation and pregnancy on the uterine tissue. So uterine fibroids are found most often from the ages of thirty to fifty, and in married women. Still, they are frequently met with in the unmarried, and in women under thirty. There is the relationship also of cause and effect between uterine fibroids and sterility. They are both constantly associated with an old history of dysmenorrhœa. It will be found that in these sterile cases the cervix is frequently malformed and conoidal in shape. It is curious that the African races, in which malignant disease is not a common affection, should be so liable to fibroid tumours. This fact does not support the view (Routh) that cancer is a common form of degeneration of fibroid tumour.

Pathology.—Fibroid growths of the uterus have their origin in the muscular and connective tissues in the wall of the uterus, and more especially those of the body. The term 'fibrous' is not strictly accurate. The name 'fibro-myoma' expresses better the constitution of the tumour most frequently found. Some tumours present more the character of the muscular, others of the connective-tissue elements. The

tumour is proportionally hard, according to its age and the development or preponderance of the fibrous tissue.

With regard to the vascularity of fibroids, save in the very large varieties, the arteries are not numerous. Yet the fact that the *bruit de souffle* is occasionally heard shows the size which may be attained by a vessel. The veins, especially those of the periphery, are large. A condition of venous intussusception, with fibromatous fibres interlacing, has been termed by Virchow 'telangiectasis,' or cavernous myoma. Fibromatous polypi are not vascular, and the pedicle seldom contains vessels of any size; those which are present are remarkable for their retractile quality. Klebs has described what he considers to be lymphatic spaces between the bundles of fibres. Nerves have been traced into them by Bidder and Herts (Pozzi).

Alban Doran says: 'The muscle-cells of a myoma are usually larger than those of the uterus in which it grows. Hence in a myoma removed during pregnancy they appear very large. Fig. 273 represents a section of a myomatous tumour of the uterus, removed at about the fourth month of pregnancy.

'By the term fibro-myoma,' he says, 'is implied a uterine tumour where groups of muscle-cells are blended with, or completely separated by, conspicuous tracts of true fibrous tissue. A small amount of young connective tissue as seen in the uterus is never absent from a pure myoma; in fibro-myoma we see well-defined wavy bands of white fibre. Microscopically no two sections of fibro-myoma of the uterus look alike. Sometimes wide bands, purely made up of muscle-cells, predominate; sometimes the field is covered with white fibre, resembling that of which a fibroma of the ovary (Fig. 274) is entirely composed. Lastly, the muscle cells, or at least structures resembling them in size and appearance, may be intimately connected with the fibrils which make up the fibrous bands. This latter condition is well indicated in Fig. 276, which represents a section of a pedunculated subperitoneal "fibroid." Of all "fibroids," fibro-myoma is the commonest form. The presence of connective tissue in myoma, and also

in fibro-myoma, probably accounts for the malignant degeneration of "fibroids," of which cases have been recorded.

'The important question, whether *myoma* of the uterus may degenerate into a sarcoma, must be answered in the affirmative (see chapter on Cancer). Virchow, Schroeder, and Martin believe that such a metamorphosis does occur. In fact, it is regarded by some as the rule in cases of sarcoma. David Finlay recorded such a case before the Pathological Society of London, in which the tumour was encapsuled, as is the case in uterine myoma. This patient had noticed a hard swelling in the abdomen for fifteen years before the rapid increase occurred that called for interference.'*

Alban Doran, in a most interesting paper read before the Pathological Society (session 1890), discussed the entire question, and he then exhibited a tumour in which such transitional changes appeared to be occurring at the time of removal:

'The tumour was practically an expansion of the fundus, lying in its walls, which thus formed the capsule. Elsewhere the uterine walls were soft and very thick, entirely free from interstitial fibroids. Thus the tumour was solitary. A phlebolith, in appearance like an oval, semi-transparent, yellow pebble, one-eighth of an inch long, lay under the serous coat of the uterus posteriorly. Pure fibrous tissue was practically absent. Uterine muscle-cells abounded. They formed thick bundles, and each cell was very elongated, and bore a long, narrow ("staff-shaped") nucleus. Groups of cells of a different type were also present. They were quite as distinct as the muscle-cells, but shorter and much thicker. The nuclei were distinctly oval and wide in the middle. The two varieties of cell above described are represented in the drawings' (Lewin, Figs. 275, 276, p. 394).

A uterine fibroid may pass into different forms of degeneration: (*a*) fatty; (*b*) colloid or myxomatous; (*c*) calcareous; (*d*) suppurative and gangrenous. The most important change from a practical point of view, as it is very frequently met with and influences the diagnosis of fibroid disease, is the formation of cysts in the tumour. Cysts may form from (1) colloid or myxomatous degeneration of the connective tissues; (2) hæmorrhagic effusion into the substance of the tumour; (3) œdema

* Trans. Path. Soc., vol. xxxiv., 1883, p. 177.

and effusion of serum, with separation of the fibres, and softening or liquefaction of the tissue, and the resulting

FIG. 273.—Myoma of a Pregnant Uterus, showing extreme hypertrophy of the muscle-cells (Alban Doran).

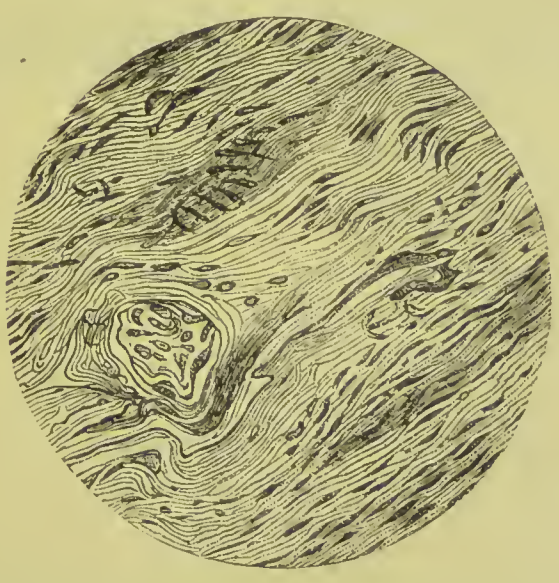


FIG. 274.—Fibro-myoma of the uterus. In some parts of the field the muscle-cells and the fibrous tissue lie separate; in others they are closely blended (Alban Doran).

formation of a cyst-like cavity; (4) fatty degeneration of the tumour. The transformation of a *fibroid* tumour into a

carcinoma is extremely rare; the transition into a sarcoma of a malignant nature is not so very uncommon.

Degenerations of Fibromata.

Of the various degenerative changes which the fibroid may undergo, Pozzi, in his recent work, gives the following: (*a*) *Calcification*, which is comparatively rare, and in which there is a deposit of the lime salts, forming in some instances uterine concretions. A number of such cases have been described by Everitt (*Amer. Jour. Obs.*, 1879, vol. xii.). (*b*) *Amyloid.*—This condition has been seen by Strass in a polypus. (*c*) *Colloid.*—This is a myxomatous state. It has been described by Virchow as mucous effusion between the muscular fibrillæ, the mucine distinguishing it from simple œdema, as well as the proliferation of nuclei and round cells in the interstitial tissue. (*d*) *Ramollissement.*—This is a process of retrogression analogous to that which takes place in involution of the uterine tissues after labour. In this case the degeneration is of a fatty nature, but has not been verified microscopically, as noticed by Gusserow. To these we may add *Sarcomatous.*

Fibromitis.

Under the name *fibromitis* Menière has drawn attention to an interstitial inflammation of fibroids, caused either by injury,

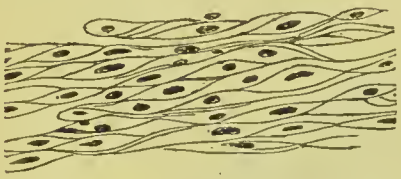


FIG. 275.—Section of the Tumour, showing bundles of well-formed plain muscle-cells ($\frac{1}{8}$″ objective).

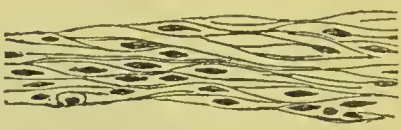


FIG. 276.—Another part of same section, showing shorter fusiform cells with large oval nuclei.

exposure to cold, or occupation. There are the premonitory symptoms of inflammation—local pain and tenderness, general malaise, and constitutional disturbance. These are attended by rapid enlargement of the tumour. Symptoms of pelvic peritonitis may supervene. If suppuration should occur, the usual symptoms of a forming abscess attend on it. Such an abscess may involve the adjacent viscera. The course of this disease is tedious, though the prognosis is generally favourable. The affection must not be confounded with hæmatocele, pelvic peritonitis, or renal or hepatic colic. I attended recently a lady who suffered from all the symptoms typical of this 'fibromitis.' She passed through all the stages mentioned by

him, and after the attack subsided, the uterus regained nearly, though not quite, its original size.

Growth of Fibromyomata.

In a paper on the 'Biology of Fibromyoma of the Uterus,' Ludwig Kleinwächter (*Zeitschrift f. Geburtshülfe und Gynäkologie*, *Trans. Brit. Gyn. Jour.*, August, 1895) discusses the development of fibromyoma.

The more muscular the growths are, the more rapid, according to Gusserow, is the growth, which is also dependent upon changes in the blood supply or inflammatory processes. Menstruation frequently decreases the size of the tumour. Constriction of the pedicle, by causing œdema, is followed by increase. Protracted illness may bring about a decrease of the tumour, but the general result of his investigations would tend to show that the rapidity of growth varies considerably in different cases. Schorler thinks that the first evidences of the commencement of the growth of the tumour are not observable before three months. From forty cases that occurred in Kleinwächter's clinique, he draws the following conclusions:

'No conditions in the growth of fibromyoma of the uterus are sufficiently strongly marked and regular to enable one to determine the age of a tumour from its size. In the generality of cases the growth seems to be rapid—only in exceptional instances slow. Occasionally the growth appears to advance by leaps and bounds. After the tumour has increased very slowly for a considerable time, it suddenly increases with extreme rapidity, and in a few months attains an excessive size, unless pregnancy should intervene. It is only in exceptional cases that a tumour comes to a standstill in growth, or decreases in the pre-climacteric years. It appears as though ergotine treatment aided this result in isolated instances, but the same thing might have occurred without the use of this remedy. Wasting diseases seem here to play a part.'

Influence of Pregnancy and the Menopause.

'During the progress of pregnancy existing tumours grow rapidly, or new ones appear and quickly increase in size. These phenomena are only to be observed in the case of the increased growth and life of the pregnant uterus. In puerperal involution these tumours decrease again, and eventually disappear, to all appearance, entirely. Sometimes the growth of large fibromata is preceded by the formation of small submucous or interstitial growths. A fibrous polypus may also be quickly followed by another one. Not infrequently several submucous fibromyomata are present, which may develop later on at various periods. The climacteric years have not nearly as great an influence on the shrinking of fibromyomata as has hitherto been supposed. Very often the tumours grow in spite of the menopause, and even more rapidly than before. It almost seems as though during this time the greatest danger of a malignant degeneration of these tumours were to be feared.

'Doubtless, the original topographical position of the tumour or its covering is also a weighty factor in the case. Influencing circumstances should also be

sought, as, for instance, whether newly-formed bloodvessels are taken into the tumour by way of the pseudo-membranes or not. In conclusion, inflammatory conditions of the periphery of the uterus, or inflammation of the deeper muscular tissues of the uterus, may both have an influence on the quicker or slower growth of the tumour.'

Varieties.—We may classify fibroid tumours of the uterus—(1) according to their pathological character; (2) their situations:

(1) Fibroma.
Fibro-myoma.
Myo-sarcoma.
Fibro-myxoma.
Sarcoma.
Cystic sarcoma.
Myxo-sarcoma.
Cystic fibro-myoma.

(2) Fibroid tumour of the cervix.
Fibroid tumour of the body.
(*a*) Sub-peritoneal; subserous.
(*b*) Submucous.
(*c*) Intra-mural; parenchymatous.

Pozzi divides fibrous tumours of the uterus under three heads. The first includes those which are not of large size, and which remain in the uterus. Secondly, those the growth of which tends towards the vagina. Thirdly, those which develop in the direction of the abdominal cavity, and he tabulates the three types as follows:

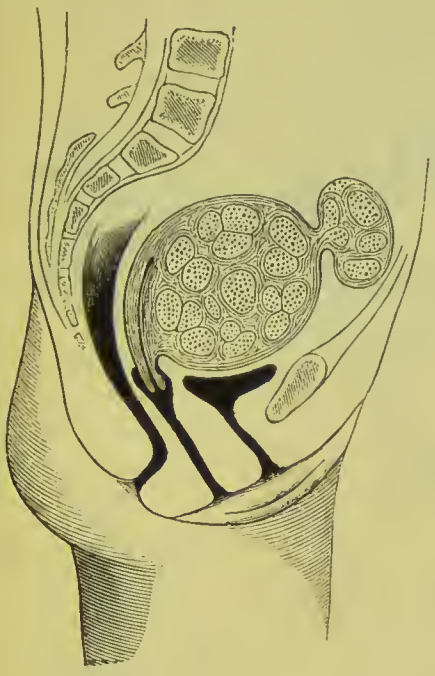
I. Metritie (small interstitial fibroma).

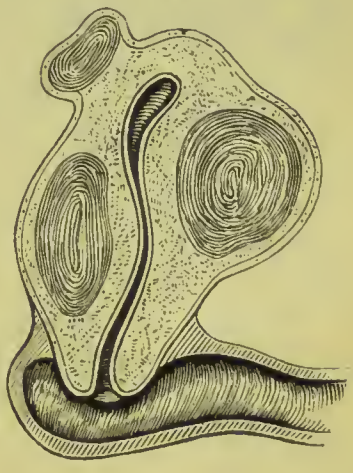
II. Type developing toward the vagina.
- A. Fibromas of the intra-vaginal portion of the neck, sessile or pedunculated.
- B. Submucous fibromas of the body.
- C. Pedunculated fibromas of the body, or polypi, these latter being (1) intra-uterine or (2) intermittent in appearance, protruding from the uterus at the time of the catamenia and retreating in the intervals; and (3) intra-vaginal.

III. Type developing toward the abdominal cavity (subperitoneal or interstitial).
- A. Pedunculated fibromas.
- B. Sessile fibromas, not including those in the broad ligaments.
- C. Sessile fibromas, included in the broad ligaments. } Abdominal. Pelvic.

Fibrous tumours are attached to the wall of the uterus either

by a pedicle or by a broad base. The *subperitoneal* tumour pushes the peritoneum before it. It may become detached





FIGS. 277, 278.—Interstitial and Subperitoneal Fibroids, from Schroeder (Fig. 278) and Emmet (Fig. 279).

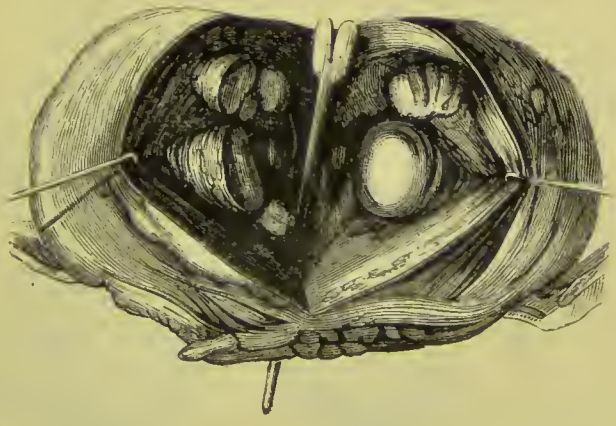


FIG. 279.—Interstitial Fibromata in the Fundus of the Uterus (after Pozzi).

from the uterus, or remain attached to it by a long pedicle composed of peritoneum and connective tissue. The *submucous* grows into the uterine cavity. If it be pedunculated, it is known as *fibrous polypus*. If parenchymatous, it may be

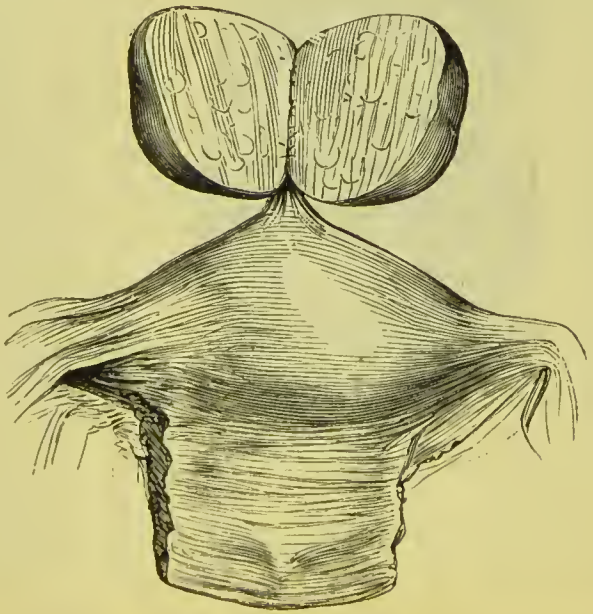


FIG. 280.—Subperitoneal Pediculated Fibroid (Robert Barnes).

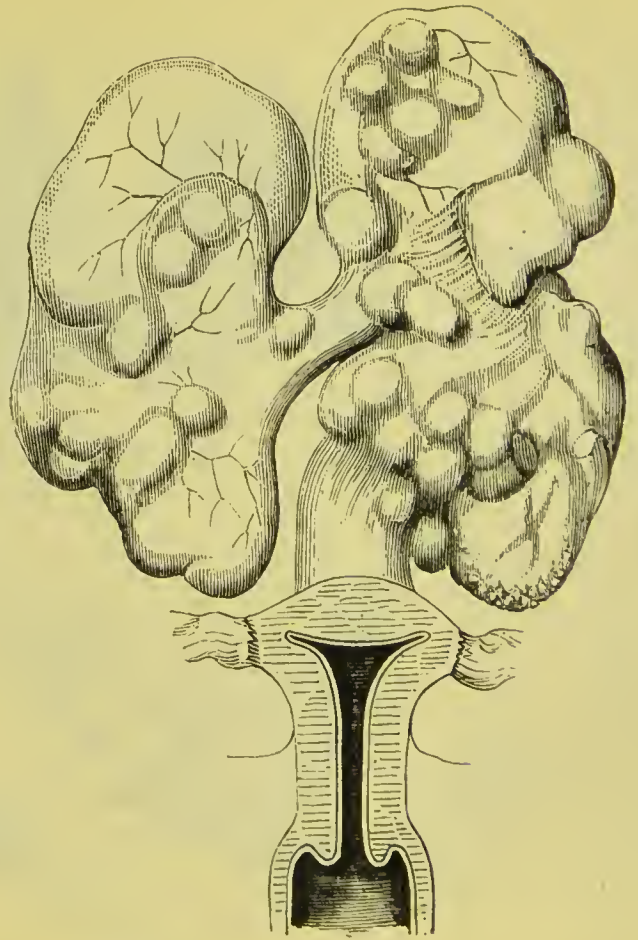


FIG. 281.—Pediculated Subperitoneal Fibroid, with Multiple Nuclei (Macnaughton-Jones).

single or *conglomerate*, encapsuled or non-encapsuled. The conglomerate may be formed by the fusion of a number of small fibroid masses, which give to the tumour a lobulated appearance. They may lie in a capsule of cellular tissue, or they may be simple outgrowths from the uterine wall, and continuous with and devoid of any capsular investment.

Diagnosis.—We distinguish a fibroid tumour of the body of the uterus by—

The history of the case.

Careful examination of the abdomen (see 'Examination of a Case' and 'Methods of Examination').

Digital and bimanual examination (rectal and vaginal).

The uterine sound.

The diagnosis of some fibroid tumours of the uterus is not always so easy a matter as it may appear. Years ago, when a student, I saw an excellent surgeon, after the preliminary incision for ovariotomy, fail in endeavouring to push a trocar into a solid fibroid of the uterus. Several experienced physicians and surgeons had concurred in the diagnosis. By that lesson (the woman died the same day) I was first taught the need for that extreme caution which in ambiguous cases we must exercise before we arrive at a conclusion, or pronounce an opinion in many cases of abdominal tumours. The old dictum, 'Verify, verify, and for a third time I say verify,' is not more truly applicable to anything than to the case of abdominal tumours. While exercising all the care and caution that he possibly can, the surgeon may fall into error in some cases. Spencer Wells says: 'In fact, it has happened to many surgeons, and to myself amongst the number, that we have commenced operations, as ovariotomy, and even removed tumours from the abdomen, under the impression that we were dealing with diseased ovaries, when, upon examination, they have proved to be pedunculate fibroid outgrowths from the uterus.'*

* At the meeting of the Gynæcological Society held on June 23, 1886, Lawson Tait exhibited 'a huge suppurating cyst, consisting of the dilated

FIG. 282.—Fibro-myoma, springing from the ligament of the ovary (after Doléris).

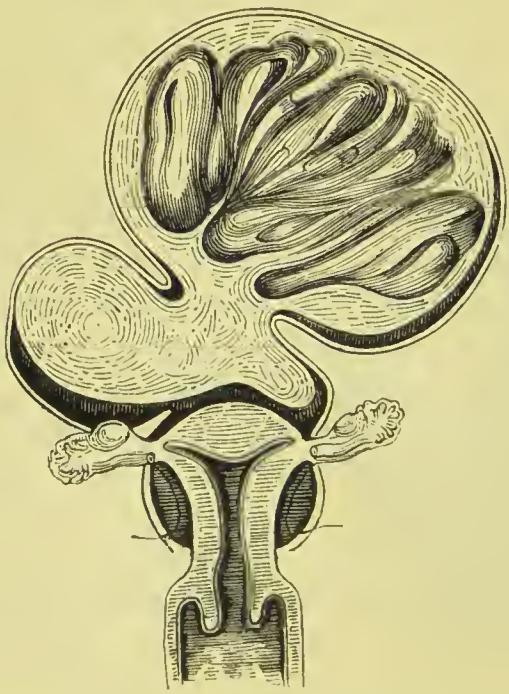


FIG. 283.—Pediculated Fibroma of Uterus, with fibro-cystic interior in one division (after Schroeder).

History of the Case.—These three negative points are of importance:—the tumour has not appeared suddenly; there have been no symptoms in the early history of the case of a febrile state; rarely is there any history of an injury. There has commonly been hæmorrhage, both menorrhagia and metrorrhagia. This latter symptom varies in degree. Occasionally the menstrual periods are irregular, and the discharge scanty. There may have been pelvic distress, and some trouble of the bladder and rectum. These pelvic symptoms depend in great measure on the position of the tumour, its size, and the rapidity of its growth. This is generally slower than in ovarian cystoma. There is not the same rapid emaciation of the countenance which we see so commonly in ovarian disease. Many women who have comparatively large uterine fibroids do not exhibit any marked change in the expression of the face, nor is the fibroid affection accompanied by the same pallor of the countenance that marks the growth of the ovarian cyst. The presence or absence of pain will in great measure depend on the position of the tumour, whether it be pediculated, and the direction in which it grows. Periodical attacks of peritonitis, or interference with the functions of the bladder or rectum, or inflammatory changes in the tumour itself, will give rise to pain. Yet one often sees large uterine fibroids the growth of which has not been attended by pain.*

Differential Signs of Fibroid Tumour.

Enlargement of the lower portion of abdomen.

Enlargement of the superficial abdominal veins.

structure of the left kidney. The patient had been seen previously by Sir Spencer Wells, who had diagnosed fibroid tumour of the uterus, and by a distinguished London physician, who remarked that he did not think there was anything very much the matter. Dr. Milner Moore of Coventry was called in, and diagnosed a suppurating ovarian tumour. Tait saw the patient with Dr. Moore, and confirmed his view, with the extension that he believed the suppuration was due to strangulation and axial rotation. During operation all the opinions proved to be wrong, for the tumour turned out to be the left kidney.' The patient made an admirable recovery.

* See Doyen's schemes of the relations of the annexa to uterine fibromata, p. 483.

Sensation imparted on palpation—rather of a solid, symmetrical, and fixed tumour.

Tumour usually central; the increase in abdominal measurement is most marked from the pubes to the umbilicus.

The uterine enlargement, even early in the disease, may be defined by palpation and percussion over the pubes. This is best effected by pressing the ulnar border of the hand deeply a little above the pubes, thus making tense the abdominal wall, and pushing upwards the viscera. Vascular murmurs are frequently heard synchronous with the pulse.

By vaginal and bimanual examination, the uterus is found enlarged, either in its anterior or posterior wall. The extreme hardness may be at once apparent to the finger, or we may find two or three nodular enlargements; or the entire uterus may feel like a hard, immovable mass, fixed in the pelvis.

The os uteri is generally healthy, at times depressed; but more frequently, in advanced fibroid tumour, it has receded, and may not be reached by the examining finger.

There is occasionally a characteristic hardness of the cervix, which may be felt, like the nipple of the breast, moving over a stony hard surface. This mobility of the conical cervix, independent of the enlarged body, is very marked in many cases of fibroid tumour.

The rectal and recto-vaginal examinations discover the enlarged, fixed, and hardened uterus.

Negative Signs.

There is not (generally) any fulness or prominence of the umbilicus.

There is rarely (save in fibro-cystic disease) any fluctuation. If present, it is very different from the superficial wave seen in ovarian disease.

(When there is a hard pelvic tumour, and at the same time evidence of the presence of fluid, we suspect the fluid to be ascitic.)

There are no uterine contractions.

The characteristic signs of pregnancy are absent.

Jones (*Edinburgh Medical Journal*, March, 1888) has drawn attention to a condition of the pregnant uterus which may be mistaken for a fibroid tumour, in which the characteristic feel of the former is absent, as also the pear-shape of pregnancy, there being a false sensation of the presence of a pedicle. He attributed it to an absence of the amniotic fluid. Pozzi ascribes it rather to a pre-existing condition of hypertrophy or elongation of the neck of the uterus.

The Uterine Sound.—We thus see that in a considerable proportion of cases we may feel satisfied of the nature of the tumour without the use of the uterine sound. But this mode of examination is absolutely necessary to confirm the diagnosis in a number of fibroid tumours. By it we learn (utero-abdominal, utero-vaginal, and utero-rectal methods)—

(*a*) The degree to which the uterus is enlarged;

(*b*) That the tumour felt through the abdominal wall *is* an enlarged uterus;

(*c*) That the tumour is fixed or movable;

(*d*) To differentiate fibroid tumours from other pelvic enlargements or flexions of the uterus.

The uterine sound is passed into the uterus. The finger in the anterior or posterior fornix does not perceive that there is an intervening body between the finger and the sound. By the utero-abdominal and utero-rectal methods, we verify the test. We thus distinguish an intra-mural fibroid from anteflexion or retroflexion.

Dilatation by Tents and Exploration.—In some cases, when still in doubt, we may have to dilate the uterus and explore the cavity with the finger. This might be required in such a case as that described by Schroeder, where the history pointed to a blighted ovum. On dilatation the tumour was discovered to be a hard fibroid. The same step may be needed in chronic hyperplasia. The necessity for dilatation in the diagnosis of fibroid of the fundus or submucous pedunculated tumours has to be urged. Without dilatation and exploration with the finger, it is often impossible to discover such growths.

Symptoms.—Uterine fibroid frequently exists, and yet there are no symptoms to attract attention during life. The presence of the tumour is only discovered in a post-mortem examination. The most important symptom is that of menorrhagia. This comes on gradually, at first as an increase of the menstrual period; after a time, this may amount to a flooding, or there may be irregular hæmorrhages. The loss of blood may threaten the life of the patient. Death has followed from rupture of a uterine sinus. Large vessels do not generally enter a uterine fibroid, or at least only such as have no capsule, and which have an intimate connection with the uterine tissue. The blood is poured out by the congested mucous membrane of the uterus, and not by that covering the fibroid. Cervical fibroids do not, as a rule, cause hæmorrhage.

Pain.—This assumes, in many instances, the form of dysmenorrhœa, especially in the case of the cervical fibroid. Pain also occurs from the weight and distension, and the pressure of the tumour on the viscera and nerves of the pelvis. It is frequently of a 'bearing-down' nature.

Pelvic Symptoms.—Pressure on the bladder, rectum, and ureters produces frequent and painful micturition, constipation, and pain in defæcation. It may lead to hydro-nephrosis, or albuminuria, with uræmic symptoms. The consequences that may arise from compression of the ureters have to be kept in mind in cases of growing or large fibromata, and will naturally suggest that the urine in these cases should be from time to time examined, not alone for the presence of albumen or hyaline casts, but also for an increase in the quantity of urea.

Sterility.—This is a common consequence of uterine fibroid. Fibroid tumours may induce abortion, seriously complicate labour, and cause post-partum hæmorrhage.

Results.

1. *Arrest of Development.*—It may thus interfere but little with the health or comfort of the individual.

2. *Spontaneous Absorption.*—This is extremely rare.

3. *Spontaneous Enucleation.*—The tumour is protruded through the lacerated or sloughing mucous membrane. It is thus uncovered, and is forced onwards into the vagina by the uterine contraction.

4. *The tumour becomes pediculated*, and is extruded into the vagina in the form of a polypus; or it may, if subperitoneal, become adherent, and remain either attached to some organ or lie loose in the peritoneal cavity.

5. *Suppuration and Gangrene.*—This may lead to perforation of the other viscera, peritonitis, and septicæmia. It may thus be disintegrated and discharged in fragments. Adhesions may form between the tumour and any of the neighbouring viscera, which vary in the degree of adherence from those which are easily detached or broken down, to the adhesions which render it impossible to separate the agglutinated parts without injury. These remarks apply more particularly to the omentum, intestine, and bladder.

6. *Inversion of the Uterus.*—It is well to recollect that those fibroid tumours having a broad base, and which are connected with the parenchyma of the fundus, may cause, in their growth and extrusion, partial inversion of the uterus.

Fibro-cystic Tumours.

Differentiation.

I hardly know any affection in the diagnosis of which the practitioner is more likely to fall into error, than in that of fibro-cyst of the uterus. I can recall to mind a few cases myself, in which, notwithstanding repeated and most exhaustive examinations, I have been mistaken. Still, this liability to err, with our improved knowledge, is becoming less each day. If the practitioner be resolved to take nothing for granted in the examination of a patient, and pass step by step by a process of exclusion to his final judgment, he will not be likely to make any mistake. Let us suppose that he has to distinguish in a given case *between ovarian tumour, pregnancy, and a fibro-cyst* of the uterus. He must, when he comes to decide

the question of fibro-cyst, side by side with the other two conditions, place especial value on these points:

1. The length of time the tumour has taken to grow, and its mode of growth.
2. In palpation, the irregularity or dense feel of the tumour in parts.
3. The obscure character of the fluctuation as compared with ovarian dropsy.
4. The exclusion of the signs and symptoms of pregnancy.
5. The depth to which the uterine sound passes.
6. The mobility of the tumour with the uterus, both with the uterine sound and bimanually.
7. A careful examination by the rectum and vagina of the tumour *under an anæsthetic*, in the bimanual method.
8. Aspiration and examination of the fluid.
   (*a*) Its property of coagulating, spontaneously and by heat.
   (*b*) The presence of Atlee's fibre-cell.
9. By an exploratory incision: the colour of the uterine wall (dark red) is characteristic and quite distinct from the appearance of the cyst wall of the ovarian cystoma.

(See chapter on 'Diagnosis of Ovarian Tumours.')

Pregnancy complicating Fibroma.

Differentiation and Diagnosis.

The possibility of pregnancy and fibroma of the uterus co-existing must not be forgotten in making a diagnosis, especially in those cases in which we are assured of a rapid growth of the tumour. We must not be misled by the fact that the catamenia have appeared. We may be confronted with a case in which the existence of pregnancy is not suspected, the presence of a tumour alone being recognised; or one in which the woman has been ignorant of the presence of a tumour, and attributes her symptoms to pregnancy. Or, again, we may be called to a case in which the woman, though cognisant

of the presence of a tumour, fancies (through the cessation of the menstrual act) that she has become pregnant.

It has to be remembered that serious errors of diagnosis have been made with regard to fibroma and pregnancy. *The uterine pains* due to the tumour, when there has been effacement of the cervix, have been mistaken for those of labour, as pointed out by Peuch (*Archives de Gynæcol.*, vol. xxii., November 11, 1895; and *Gaz. des Hopitaux*, August, 1895).

The prominences occasioned by the fœtal members disappear when the uterus contracts, while those of fibromata are made more manifest. The same author quotes instances in which fibroma has been mistaken for ovarian cystoma at the time of labour, and *vice versâ*. Such authorities as Tarnier, Paul Dubois, and Danyan have fallen into this error. *Irregular hæmorrhagic discharges* may persist during pregnancy in cases of fibrous tumour. It may be necessary, in order to clear the diagnosis, to use a fine aspirating-needle in the interval between the pains. Fibroma of the cervix has been mistaken for *malignant disease*. Here attention to the distinctive features of carcinoma should prevent error. *Tumours growing from the pelvic walls*, such as fibromata, osteomata, and enchondromata, may be mistaken for uterine fibromata. Careful exploration to determine the independence of the uterus, under an anæsthetic, will prevent this. *Fœcal tumours* have also (Braxton Hicks) been confounded with fibroma. As to *placenta prævia*, careful exploration will lead to a recognition of the characteristic feel of the placenta, though of course a fibroma may complicate the presentation, and this must be remembered in the examination. This fact is important, that hæmorrhage is more likely to occur during the latter months of pregnancy from the placental complication, while it may take place at any time during the nine months, and may last all through, with irregular pains, in the case of the uterine tumour. The management of a case in which fibro-myoma of the uterus complicates pregnancy will entirely depend upon the features of the individual case.

Treatment of a Fibroma complicating Pregnancy.—Lefour insists that as long as the lives of the mother and child are not in danger, we should not interfere. Should this become necessary, the patient is placed in the genu-pectoral position, and pressure is made on the tumour in the intervals of the pains, and thus room is secured for the descent of the fœtus. If the growth should spring from any part of the inferior segment of the uterus, and is thus forced forward by the child, ablation is performed by torsion, ligature, and excision, if it be pediculated, or it is removed by enucleation by the fingers or a blunt spatula should it be interstitial. On the other hand, if the case be of such a nature

that none of these plans are likely to succeed, or that they fail, the obstetric step of forceps or version may be tried, failing which cephalotripsy and embryotomy remain. There are also the alternatives of Cæsarian section or Porro's operation to fall back upon.

For the abstract of the original paper, by P. Peuch, Montpellier, with complete bibliography, see *Brit. Gyn. Jour.*, parts 44, 46, 1896, and in the latter journal a series of interesting cases of pregnancy complicated by fibro-myomata, by Haultain, of Edinburgh.

In a case I saw in consultation with Dr. J. Hill Gibson, the patient had passed two menstrual periods. She had had abdominal pain, tenderness, and

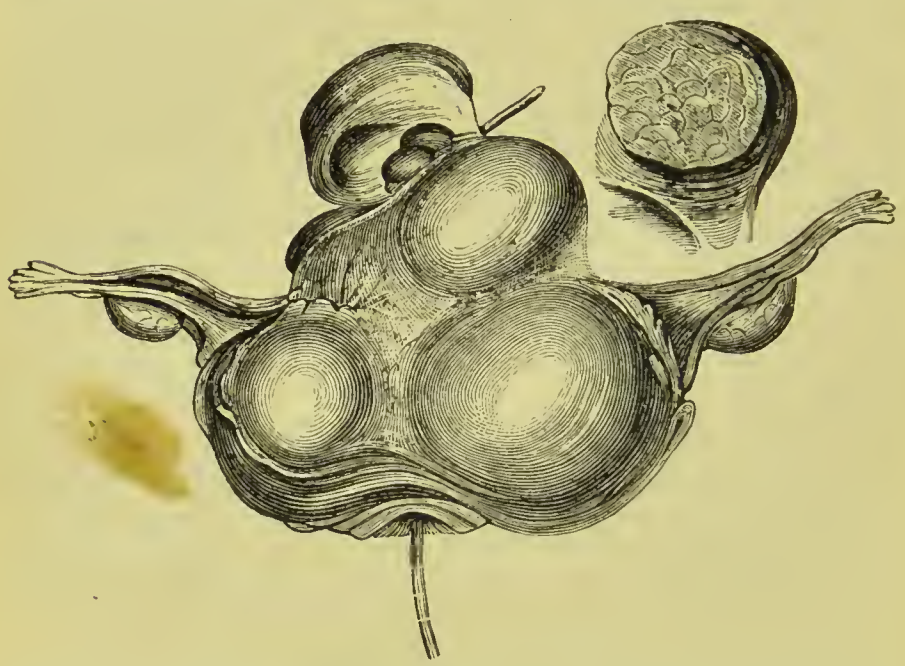


FIG. 284.—Interstitial Fibromata occurring in a uterus in which triple conception occurred, delivery being effected at the ninth month. Three large myomata occupy the entire uterus; a fourth grows from the fundus, to which three smaller ones are attached—one of these is becoming pedieulated and subperitoneal. There was no rupture.

sickness. The symptoms described as those of *fibromitis* were present. On examination it was discovered that she had a large and irregular fibroma. The decision on the question of superadded pregnancy was rightly deferred. Time proved that she was not pregnant.

Often such outgrowths cause considerable displacement of the pregnant womb, and may give rise to doubts as to the normal character of the pregnancy and the position of the child.

FIG. 285.—Specimen of Myomatous Pregnant Uterus and Fœtus (G. Elder).

The drawing (p. 408), for which I was indebted to the late Dr. Byrne of Dublin, is one of an interesting case, the particu-

lars of which are recorded by McClintock (*Diseases of Women*, pp. 116-117).

It represents a uterus affected with interstitial fibromata, which was taken shortly after death from a woman in the Rotunda Hospital, Dublin, and which is in its museum. There was a triple conception, gestation being prolonged to the ninth month. On September 22nd, 1858, the mother was delivered of a dead female child. She was brought to the Rotunda, where a second child was born alive, the third child being extracted. She died in three hours of collapse.

I was sent a case some time since as one of tubal pregnancy, the projecting tumour in the left iliac fossa being mistaken for the extra-fœtation. The child was in utero, though at the period of pregnancy—the commencement of the fourth month—it was very difficult to pronounce positively, more especially as the woman was uncertain of the time of conception from irregularity of the menses.

At the British Gynæcological Society, February 13, 1896, G. Elder, of Nottingham, showed the uterus of a patient which contained a fœtus 8 inches long (Fig. 285). In the left broad ligament there was a series of small pediculated myomata, in all about the size of a fœtal head at term. In the uterine wall was another flattened myomatous mass, and other nodules existed both in the fundus and cervix. The growth, which had caused intestinal obstruction, was successfully removed by supra-vaginal extra-peritoneal hysterectomy, an important feature of the case being that the patient had never suspected any uterine trouble until she became pregnant.

Treatment of Uterine Tumours.

The Palliative and Expectant Method consists in the use of means calculated—

1. To reduce hyperæmia and congestion.
2. To control and prevent hæmorrhage.
3. To promote absorption of the tumour.
4. To subdue pain and relieve rectal and vesical distress, and reduce hyperæmia and congestion.

To reduce Hyperæmia and Congestion.—Internally, for this object we give such medicines as ergot (liquid extract); hydrastis; stypticine; digitalis; iodide of potassium; bromides of sodium and potassium.

Bedford Brown reports favourably of the prolonged use of Syrup of Lactophosphate of Lime and Syrup of the Hypophosphites, given in ℥ii. doses three times in the day. I have frequently given Fellows' Syrup in anæmia from recurrent hæmorrhage in fibroids, and find the combination with Dusart's Lactophosphate of Lime Syrup an admirable restorative and tonic.

Hydrastis Canadensis.—My success with hydrastis in fibroids has been uncertain. I have given it in a number of cases, both as tincture, fluid, and extract. A useful mixture for checking hæmorrhage is:

R. Acid sclerotic, gr. iv.
Tinct. digitalis, min. lxxx.
Tinct. hydrastis Can., ℥ss.
Tinct. matico, ℥ss.
Elix. saccharin, min. xxx.
Inf. matico ad ℥viii.

One-eighth part every third or fourth hour.

The liquid extract of ergot (℥ss.) may be substituted for the sclerotic acid, and tincture of strophanthus for the tincture of digitalis, or the strophanthus may be given in combination with the latter.

I have previously (pp. 190, 191) entered fully into the therapeutical uses of hydrastis, its alkaloid hydrastia, and stypticine.

Locally we may apply the hot vaginal douche; scarify the cervix; use astringent tampons of tannic acid and glycerine; support the uterus with a Hodge's pessary; dilate the cervix; advise proper bathing (baths of iodine and bromine may be tried), and the use of such spas or waters as Kissingen, Kreuznach, Woodhall Spa.

Sexual intercourse must be moderated, and especially it should be avoided about the menstrual periods.

To control Hæmorrhage.—The subcutaneous injection of ergotine, as recommended by Hildebrandt, is occasionally efficacious in controlling hæmorrhage. I have injected as much as 15 grains of Bongean's ergotine, mixed with water and glycerine, into the gluteal region; but the average dose is 3 to 5 grains. The needle must be passed deeply into the muscle, otherwise we are apt to cause an abscess. Still, much cannot be hoped for any result further than the control of the

hæmorrhage. The action on the structure of the tumour, or in promoting spontaneous expulsion of intra-uterine fibromata, has been unsatisfactory even after some hundreds of injections. Sclerotic acid may also be used subcutaneously (gr. $\frac{1}{2}$ to gr. i.). The solution of ergotine should be made fresh. Astringents may be given internally. The douche of hot water, 115° to 120°, should be used for ten to fifteen minutes three times in the day.

Dilatation of the Cervical Canal with sponge or laminaria

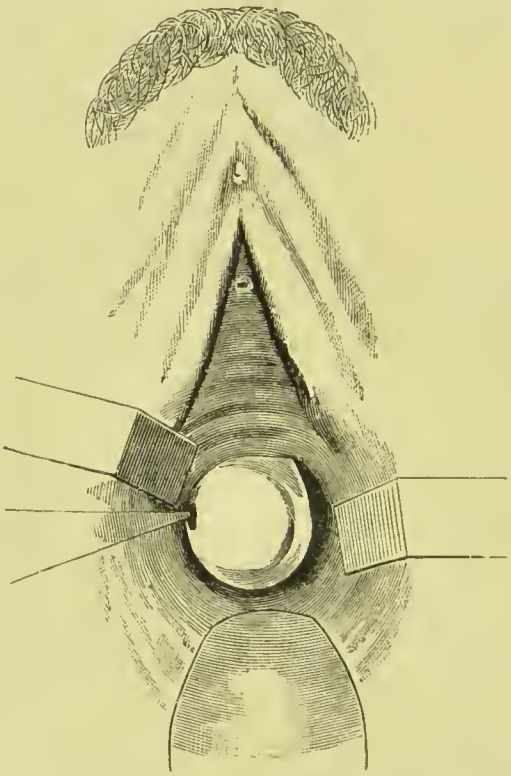


FIG. 286.—Shows Incision over Left Broad Ligament (Martin.)

tents will be found a valuable means of temporarily treating hæmorrhage.

Incision of the Cervix, in the case of a cervical fibroid, and where there is dysmenorrhœa, is to be preferred.

Ligation of the Uterine and Ovarian Arteries.

As a substitute both for hysterectomy and oöphorectomy, several surgeons, notably Robinson and Martin, of Chicago,

have ligated the uterine and ovarian vessels to check hæmorrhage and induce atrophy of the tumour. In Martin's operation, the cervix, having been well exposed by retractors, is transfixed with a strong silk ligature, any secretion from the uterine canal being restrained by a tampon of gauze, over which

FIG. 287.—Separation of the Broad Ligament with the Fingers.

the ligature is tied. The uterus having been drawn down, the left vaginal vault is exposed (Fig. 286), and the mucous membrane at the utero-vaginal junction is incised with curved scissors; one blade is then entered, and a curved incision about 2 inches in length is carried over the broad ligament at

FIG. 288.—Grasping the Base of the Broad Ligament.

right angles to it. An index-finger of each hand is now introduced (Fig. 287), and the vaginal tissue is detached from the broad ligament in front of the bladder for a space of 2 inches in height, and the same distance to the side. In doing this the

ureter is pushed out of reach. The same plan is adopted posteriorly. The peritoneum is not injured. The base of the broad ligament for a distance of 1 inch to 1½ inches from the uterus is grasped in the manner shown in the drawing (Fig. 288). Finally, a needle threaded with No. 12 braided silk, guided by the index-finger, is carried behind the broad ligament clear of all pulsating vessels, and made to penetrate it.

Thus the base of the broad ligament is ligatured firmly a full inch from the uterus. The ligature is cut short and allowed to retract. The opposite side having been similarly dealt with, both vaginal incisions are carefully closed with catgut,

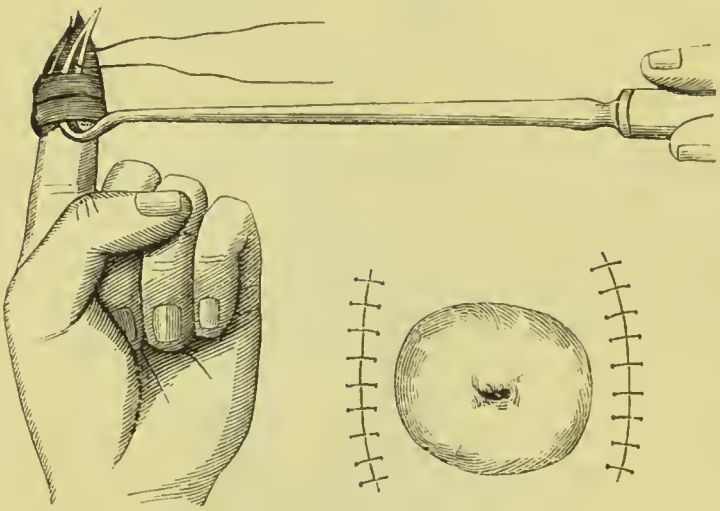


FIG. 289.—Ligaturing Base of Broad Ligament; vaginal incision closed.

thus completely burying the silk. The cervical handling-string is withdrawn, and the vagina packed with iodoform gauze. The subsequent treatment is simple. Thorough antisepsis being maintained, the vaginal wound is healed in about a week.

To promote Absorption of the Tumour.—Ergot or ergotine, in the manner recommended, especially if the tumour be submucous or interstitial, and not very hard, may be tried; also perchloride of mercury, iodide of potassium, and iodine baths.

Electrolysis was first advised by Cutter. He passed the

current through the tumour by two strong steel electrodes, inserted at either side of the abdomen, and reported an arrest in the growth in thirty-two out of fifty cases treated in this manner.

The name of Apostoli, of Paris, has now become prominently associated with the electro-caustic treatment of uterine fibromata. The student will find his plan of treatment fully detailed in the chapter on 'Gynæcological Electro-Therapeutics.'

To relieve Pain and Rectal or Vesical Distress.—This must be subdued by bromides and sedatives. The tumour, if large and pressing on the pelvic viscera, should be pushed up out of the true pelvis. If it be subperitoneal, great relief may follow this step. Special attention must be paid to the bladder and rectum. Any accumulation in the latter should be prevented. The occasional use of an enema will be indicated.

Cardiac Degeneration caused by Intra-abdominal Tumour.

Bedford Fenwick, at the British Gynæcological Society, discussed the subject of 'Intra-abdominal Tumour as a cause of Cardiac Degeneration.' Fatty degeneration of the heart was noted in 18 cases, 14 of which were ovarian, 1 omental, and 3 fibro-cysts of the uterus. Fenwick attributed this change to pressure on the diaphragm by the cyst, impeded pulmonic circulation, and impairment of the general health and nutrition. 'There is little use in delaying an inevitable step until such integral changes in the tumour and in the relation of its walls to the adjacent viscera, not to speak of general systemic effects, have occurred as to render the operation both more difficult and more fatal.

CHAPTER XXI.

GENERAL OBSERVATIONS ON THE OPERATIVE SURGERY OF THE UTERUS AND ANNEXA.

Antiseptic Precautions.—Whatever may be said by so renowned an operator as Lawson Tait, I must here enter my strong protest against any abdominal section being made, or abdominal tumour removed, without the adoption of the most careful antiseptic precautions. This opinion is not based on prejudice, nor founded on the experience of others. It is the outcome of twenty-seven years of operative work in different departments of surgery. Antisepsis should mean scrupulous cleanliness from first to last in all particulars touching on an operation, from the room in which it is done to the closure of the wound and the toilet of the abdomen, and even to the last dressing of the patient. The antiseptic used is of secondary importance. We must often operate in rooms or theatres which are not 'sterilized chambers,' we may have to fall back on this antiseptic or that, but we can always secure by care and prevision that perfection of cleanliness on which, I believe, much of the safety, and it may be the life, of the patient who has been committed to our charge depends.

These remarks apply equally to the operations of ovariotomy and oöphorectomy, as, indeed, to all gynæcological steps in which complete asepsis can be maintained. I take it as a matter of course that every hospital, worthy of the name in modern times, has its operating theatre specially constructed so as to secure the most perfect asepsis. This applies to the

tiling of walls and floor, abundant supply of hot and cold water, glass instrument cases, sterilizing chambers and apparatus, gauze drains and dressings, and the operating table.

The surroundings in the operating theatre of a hospital, and the various special means at hand for sterilizing instruments, or in the different appliances for securing the most perfect antisepsis during the performance of an operation, cannot obviously be secured in the private room of the nursing or patient's home.

Such precautions are seen in their greatest perfection in the minutest details, both as regards the operator and assistants, as well as in all the technique of the operation itself, in the specially-constructed theatres in America, and in no hospital in London in greater perfection than in St. Bartholomew's. Here I am dealing rather with the possibilities of the private 'home' or house. And I may with advantage summarize the more important essentials which I always myself secure. We may divide these, for the sake of brevity, under four heads: (1) the operator, assistants, and nurses; (2) the instruments and appliances; (3) the room and dressings; (4) the patient.

The Operator.—No clothes should be worn at any operation when there is the least suspicion that such have been subjected to any infective influence. The waterproof apron which surrounds the body of the surgeon should be scrupulously clean, and, if there be any doubt as to its purity, fumigated. Independently of previous attention to the hands and nails, these are finally thoroughly washed with disinfectant soap, and in carbolized water, before the operation begins. The nails require close paring. I like to dip my hands after the final washing in a solution of corrosive sublimate (1 in 1,000).

Many American surgeons prefer to use a saturated permanganate of potash solution, which stains the skin a dark mahogany red, and then the hands are immersed in a hot saturated solution of oxalic acid to remove this stain. Milk of lime is next used to neutralize the latter.

These remarks apply equally to all the assistants, *and more particularly to the one who directly helps in the operation itself.*

Apart from personal cleanliness, *the nurses* who attend at a gynæcological operation should be women who are thoroughly conversant with all the antiseptic measures required during its performance.

The criticisms to which some of the English hospitals have been subjected by Continental and American visitors in regard to the antiseptic surgery witnessed in the theatres are, unfortunately, not undeserved. The nurses have been a fruitful source of comment. A nurse blowing her nose and then handing a sponge, a surgeon catching a knife with his teeth, were trifling errors compared with some that drew down ridicule on the antiseptic methods in this country.

The nurse goes the previous day to arrange the dressings and prepare the necessary vessels for the antiseptic solutions. This includes the preparation and position of the operating table, the arrangement of waterproof sheeting and funnel, the disposition of the bed, if the patient should sleep in the same room as that in which she is to be operated upon. She should also arrange the dressings, bandages, and douches, and make herself familiar with the domestic surroundings of the patient's room, as well as the sanitary condition of any adjacent lavatory. From the time she arrives she takes charge of the case, superintending the diet, the use of the bath, the administration of enema, and any necessary ablutions up to the hour of the arrival of the surgeon. The gynæcological nurse should be a woman of cheerful temperament, firm and determined of purpose, cool of head and light of hand, ready in emergency, and capable of the assumption of responsibility when such is forced upon her in the absence of the operator. She or the assistant should see that the necessary tubes for drainage are amongst the appliances sent, that there is sufficient of the iodoform or other antiseptic gauze used for the operation. She prepares the bandages, and sees to the soakage of the sponges. Before the operation she arranges with a second nurse for the squeezing and handing of the sponges, and takes note of the different sutures and ligatures, so as in emergency to be prepared to rethread the needles, or supply fresh silk or gut, which latter she will see has been duly taken from an antiseptic solution.

LEEDS & NEWSROOM
MED-CHIRURGICAL SOCIETY

The Instruments and Appliances.—Before any instrument or appliance is brought to the operating-room, or placed in the operator's bag, its perfect cleanliness should be secured. No possible chance of any impurity remaining from past use should be permitted. This caution applies with double force to every form of needle, and all hinged and jointed instruments. Hence, such as can be taken to pieces, and those the handles of which are made of steel, are the best. I have boiling water, to which a little carbonate of soda has been added, poured over all the ordinary instruments before use, subsequently placing them in a five per cent. solution of carbolic acid. Should any instrument that is required have been recently used in any septic operation, it should be sent to the instrument-maker, and special steps be taken to purify it. Only those instruments likely to be required during an operation are to be placed within reach of the operator. The others may be close at hand on a second table next an assistant or nurse. The sponges require the very closest attention. I unhesitatingly say that no sponge should be used a second time for any abdominal operation, unless it has been subjected to a most exhaustive process of sterilization. It is far better to destroy the sponges used than to run the risk of their being a source of infection in a future operation.

Compressed Sponges.—Pozzi approves of the compressed gauze sponges used by Billroth. They are composed of several layers of gauze, cut in the form of squares, and hemmed evenly together at the sides, and are rendered aseptic by soakage in a carbolic or sublimate solution. They are finally kept in a similar fluid, which should be occasionally renewed. Before use they are washed in hot sterilized water, and then squeezed. They are convenient for use in cavities and chinks, as they can be made to assume any shape or form, and are very absorbent. The same compress, unless soiled by a septic liquid, can be used several times during an operation. They are then destroyed.

The compressed antiseptic sponges sold by most instrument-makers, when soaked in boiling water and placed for some hours in a five per cent. solution of carbolic acid, are among the best. At least, the precautions of soaking every newly-purchased sponge in boiling water, and, after it has lain in it for some time, allowing it to lie for a few hours in a strong

carbolic or perchloride solution, should be observed. A perfect sponge is of that size to be grasped conveniently in the fingers, and to absorb a sufficient quantity of fluid. Those sold are often too small. They should not be too porous nor readily tearable, neither should they feel hard, coarse, or rough. The sponge should be complete in itself.

General Appliances, etc., required in the Operating-room, and ready half an hour before Operation.

Lint.
Adhesive plaster.
Bandages for the hands and legs.
A leg-crutch.
Straps for the knees.
Soft flannel bandages.
Absorbent antiseptic wool.
Antiseptic gauze.
Carbolized water and carbolic acid.
Perchloride solution of uniform strength.
Carbolized oil.
Irrigation-can.
Gut and silk for ligatures and sutures.
Silver wire.
Drainage tubes and tubing.
Safety-pins.
Blankets for lower extremities.
Bottle for hot water.
A few small buckets.
A large can for hot water.
A few large flat sponges.
Smaller sponges.
Sponge-holders.
Iodoform-dredger.
Drinking-cups.
Spoons.
Brandy.

Instruments which should always be ready.

Retractors.
Scalpels.
Curved bistouries.
Grooved director.
Vulsella.
Tenacula.
Dissecting and dressing forceps.
Various pressure forceps.
Various scissors, straight and curved.
A number of Wells' torsion forceps (previously counted).
Aneurism and perinæal needles.
Wire-twister.
A few trocars.
Aspirator.
Needle-holders.
Straight and curved needles assorted for silk and gut, some threaded.
Écraseur.
Cauteries.
Paquelin's thermo-cautery.
Subcutaneous syringe.

The Room and Dressings.—The room should be well ventilated, of a proper temperature (60°); there should be good light. For the various operating tables, see pp. 45, 47, 423.

No room in any private house or home should be used for operation which has been occupied by any suspicious case of infectious disease *of any kind whatever*. The walls should be cleaned down, and all pictures and unnecessary articles of furniture removed. This includes every piece of drapery, carpet, and curtain. The floor and paint are washed with carbolized water. All preparations are concealed from the patient. It is preferable, if there be a room immediately adjoining, to administer the anæsthetic in it. When the patient is on the operating table, every dressing and all the

appliances should be in their right places. The needles are threaded, the ligatures are assorted, the accessory requisites are all placed, the sponges and forcipressure forceps are counted and verified. Each assistant and nurse is in his or her proper position. From this moment to the conclusion of the operation there should be no speaking, and only the operator's voice, in addressing his immediate assistant, should be heard.

The Patient.—On the previous night a dose of castor-oil should be given. She then has a warm bath. The vagina is tamponaded antiseptically. On the morning of the operation the abdomen and genitals are well washed with antiseptic soap. Any hair is shaved off. I prefer, having washed the surface of the skin with a corrosive sublimate solution of 1 in 1,000, to rub the skin over with absorbent wool saturated with sulphuric ether. This should be done after the urine has been passed by the patient, or drawn off by the nurse.

The vagina is then thoroughly douched out with a perchloride solution (1 in 2,000), or one of biniodide of mercury (1 in 4,000). After an enema has been administered, the rectum is washed with a saturated boric acid solution (30 in 1,000).

The woman should wear a loose but warm dressing-gown, under which is a flannel jacket, and she should have on warm woollen stockings. It is most important to attend to the warmth of the patient's extremities. As few persons as possible should be in the room in which the operation is performed. *It is the safety of the patient rather than the curiosity of bystanders which must be our chief consideration.* Those who operate for the first time should have none in the room save those required to assist, or the staff of the hospital.

Assistants and Nurses.—The principal assistant should stand at the opposite side of the table to the operator; he may have to assist in the protection of the viscera, use pressure forceps, help in ligaturing or during the management of adhesions, and in the use of sponges. Another assistant, or nurse, should be given entire charge of sponges, which are carefully counted beforehand, and *never torn.* The second assistant, or nurse,

may hand and take instruments. All the necessary appliances should be placed so as to be within ready reach of the operator. The anæsthetist should attend solely to the anæsthetic. We have already referred fully to the choice of anæsthetics and the duties of the anæsthetist (p. 69).

The surgeon had better himself check off, some time before the operation begins, with his assistant, all appliances and instruments required.

One thoroughly reliable assistant stands at the side of the table corresponding to the left of the patient. He may have

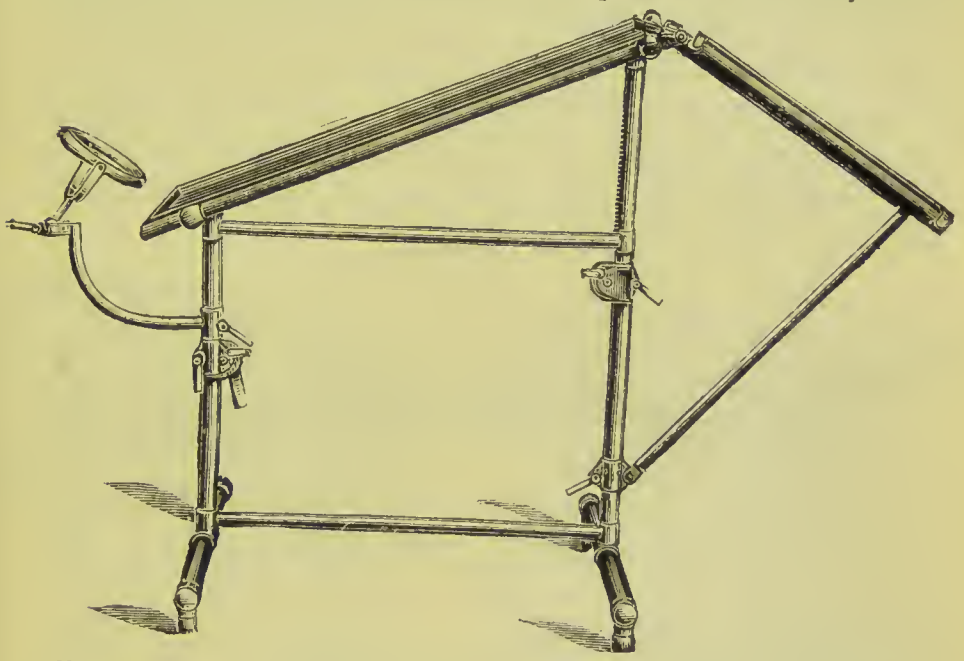


FIG. 290.—Greig Smith's Table of Steel Tubing and Glass, arranged for Trendelenburg's position.

to assist in the protection of the viscera, use pressure forceps, help in ligaturing or in the management of adhesions and in sponging. A second may be in reserve in charge of the instruments and sutures, and to supervise the cautery if necessary. One nurse has control of the sponges, and a second stands between her and the table to hand each sponge as required after it has been duly rinsed and squeezed. This nurse also checks the counting of the sponges. As to the table chosen, the reader should refer to pp. 45-49. The advan-

tage of Trendelenburg's position is that the coils of intestine gravitate from the pelvic cavity towards the diaphragm, thus being removed out of the way of the operator, unless it should happen that there are adhesions which prevent this. The view of the parts in the pelvis to be manipulated is greatly facilitated, and the risk of protrusion is lessened. Hæmorrhage is more readily controlled, and the common accidents which occur in the pelvic basin during the stripping of adhesions, or from the slipping of ligatures, are prevented. For the great majority of cases, however, the dorso-sacral position will be found sufficiently convenient. All the preliminary precautions —the washing of the abdominal wall, the shaving of the pubes, attention to the temperature of the room, the preparation of the instruments, and the threading of the needles—having been completed, *the sponges and torsion forceps are counted, and the patient's urine is drawn off.*

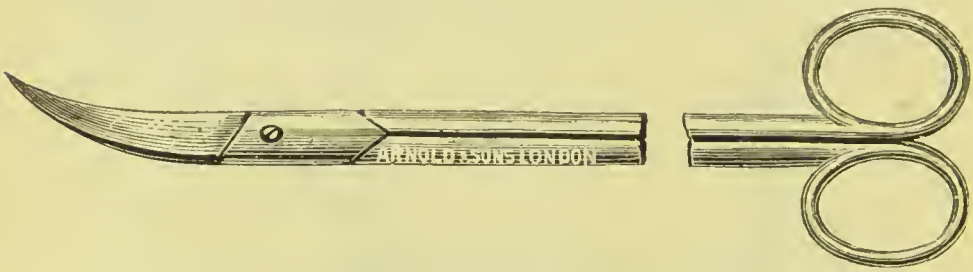


Fig. 291.—Dissecting Scissors.

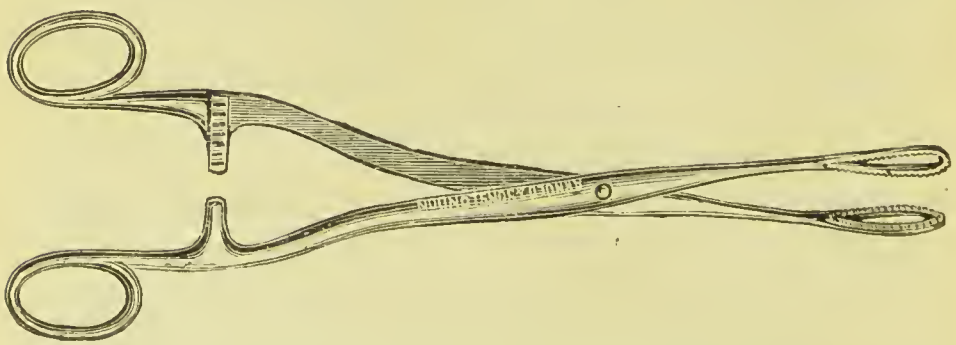


Fig. 292.—Rampley's Sponge-holding Forceps..

CHAPTER XXII.

GENERAL OBSERVATIONS ON THE OPERATIVE SURGERY OF THE UTERUS AND ANNEXA (continued).

Sutures and Ligatures.

Before entering on the descriptive details of such operations as cœliotomy for fibroma of the uterus, salpingotomy,

Fig. 293.

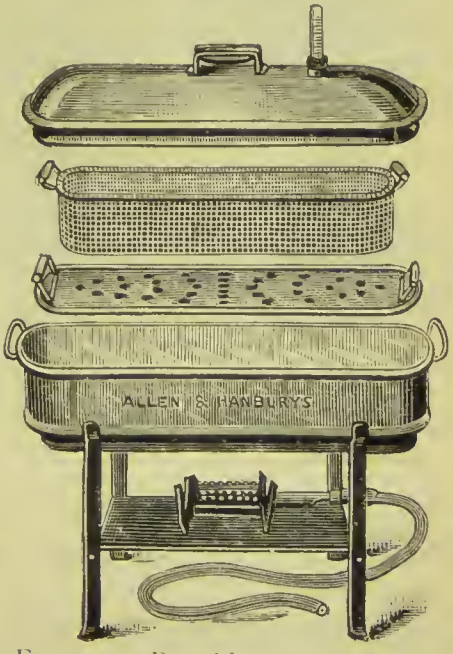


Fig. 294.—Portable and Convenient Sterilizer.

oöphorectomy, the removal of ovarian cystoma, and other grave procedures in which the abdominal cavity is opened, a few comments on sutures generally may prove of use.

I here to a large extent make use of and condense the practical observations of Pozzi on the subject of sutures and ligatures, from his important

work on 'Clinical and Operative Gynæcology,' second edition, 1892. Sutures may be of silver wire, silkworm-gut, silk, catgut, or chromicized gut. Of these *silver wire* has the advantage of being more completely aseptic. On the other hand, it is often unsuitable for application in consequence of the tendency to cut the tissues, to break, and from the time taken in adapting them. Their twisted or cut ends are apt to wound. They are, however, employed by many in operations on the vagina or perinæum, in combination with the perforated shot or metallic button. The *silkworm-gut* is tough, rather rigid, and is impermeable; but it is questionable if it make as secure a knot as silk, and it has the disadvantage of irritating the tissues through the cut ends. It should be

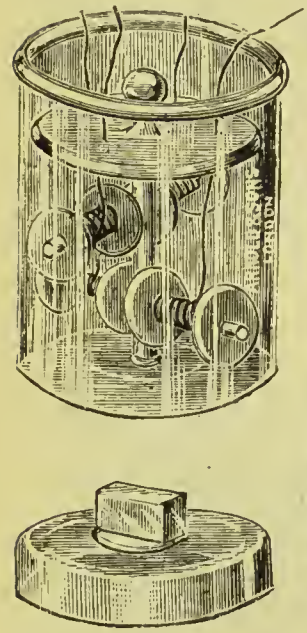


FIG. 295.

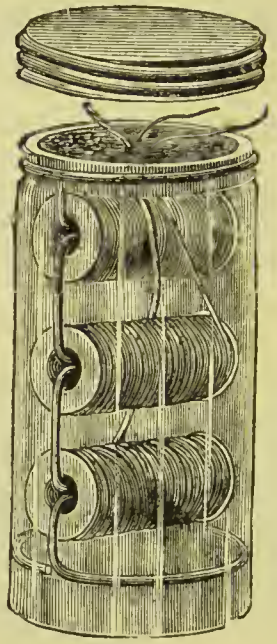


FIG. 296.

Antiseptic Reel-holders for gut and silk.

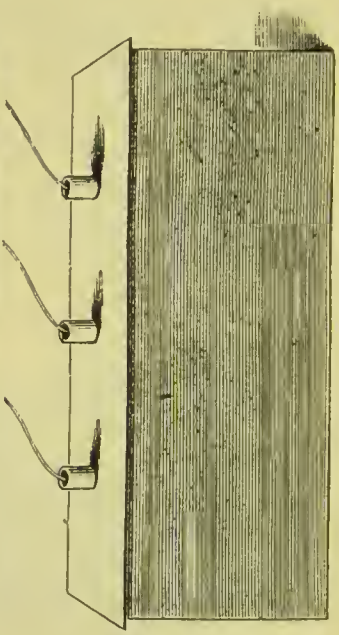


FIG. 297.—Macfarlane's Reel-holder, with reels of silk ready immersed in carbolized water. Three consistencies of silk are contained in the japanned box. Figure about half natural size.

soaked for a short time previous to use in a solution of carbolic acid or perchloride of mercury. *Silk-woven sutures* of different thicknesses are those most commonly used, and also are best adapted for the greatest variety of circumstances under which they may be required, and are really rendered antiseptic on reels contained in a portable metal box, soaked in carbolic solution, as shown in Fig. 297. The one drawback of silk is its possible proneness to favour septic action through its porosity. On the other hand, it is itself generally absorbed. The thicker threads of silk—as is also the case with catgut—are liable to remain, and form sinuses in the deeper tissues. Fine silk answers

well for suturing the bowel, the peritoneum, ligaturing bleeding-points and vessels, tying adhesions, and the closure by superficial suture of the integument.

The Catgut Suture.—Pozzi makes some valuable observations on this and the silk suture. He thinks that, both from the point of view of its toleration by the tissues and that of its final absorption, good catgut is superior to silk, and that in all cases where it is unnecessary to place sutures which must remain for a length of time in order to secure permanent union, catgut should be substituted for the silk; while, on the contrary, he prefers the latter in suturing the intestine, the stomach and the bloodvessels. In consequence of secondary infection and resulting sinuses, he would give the preference to catgut for ligatures and silkworm-gut for sutures, especially for operations in pyo-salpinx and pelvic abscess. And, for the same reason, he considers that sutures in the abdominal wall, or in contact with a drainage-tube, should not be made with silk, but with the silkworm-gut or silver wire. There is not, he says, in general surgery and gynæcology any other kind of suture or ligature that can compare with catgut.

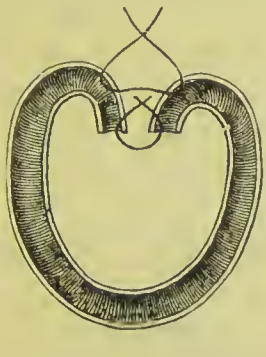


FIG. 298.
Czerny's Suture.

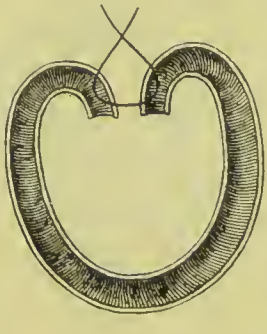


FIG. 299.
Lembert's Suture.

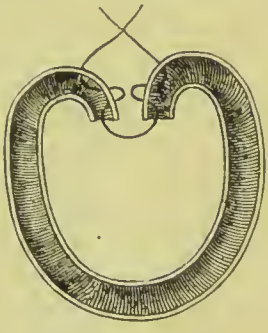


FIG. 300.
Gussenbaur's Suture.

The property which it possesses of being dissolved and absorbed in a space of time varying from eight to ten hours, dependent upon its thickness and mode of preparation, makes it invaluable for buried ligatures in the abdominal cavity, for sutures of the abdominal neck, the vagina, and for plastic operations, where removal of the threads is difficult, and often painful. His practice is to use catgut sutures, placing in certain positions superimposed knots of silk or silver wire, which safeguard the tendency of the catgut knot to become loose, and thus prevent any risk. He emphasizes the importance of obtaining good gut, and thinks the fears of Kocher of Berne on this point are exaggerated.

With reference to special sutures, a detailed description of the different varieties and of the methods of making them is not possible in a work of this nature. On the other hand, a brief reference to the most important sutures employed by the gynæcologist must be useful to the surgeon. The subjoined figures and those which follow them are taken from the valuable work of Pozzi.*

* 'Traité de Gynæcologie,' 1892, deuxième édition.

Figs. 298-300, from Pozzi, represent the three well-known methods of Czerny, Lembert, and Gussenbaur of suturing the intestine.

Pozzi divides the different forms of suture under five heads:

The Suture 'à Points séparés.'—The principle of this form of suture is to secure complete coaptation of the sides of the wound by passing three threads at different distances from its margin, from one side to the other of it The first of these, the farthest from the edge, is passed deeply and completely

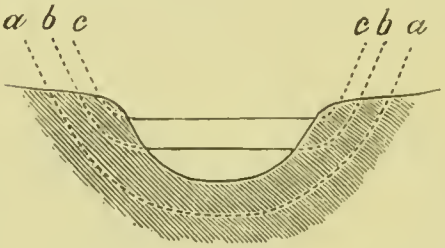


FIG. 301.—Position of the Three Threads in the Suture '*à points séparés*' (Pozzi).

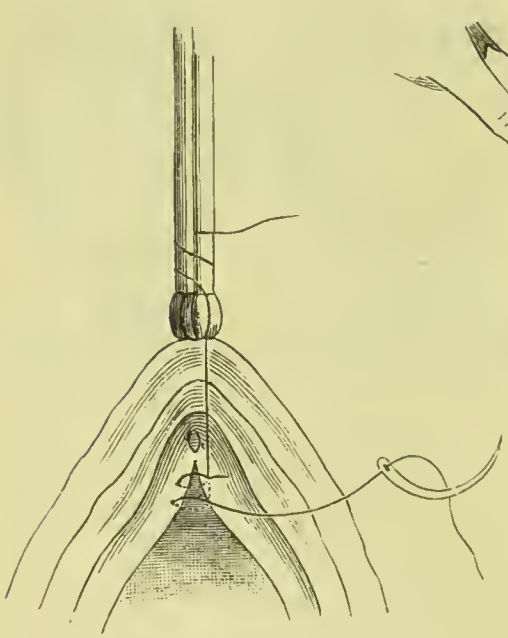


FIG. 302.—Simple Continuous Suture commenced. Forceps holding the detached stitch at the angle of the wound (Pozzi).

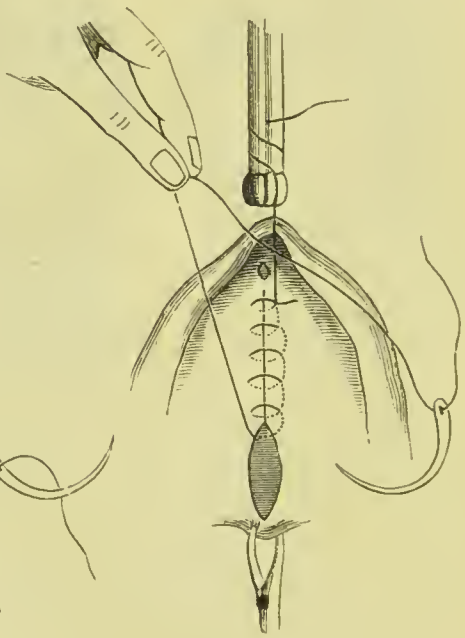


FIG. 303.—Continuous Suture nearly finished (Pozzi).

beneath the exposed surface, and is brought out at a corresponding point on the other side. The second is not carried altogether underneath, but appears crossing a portion of the wound; while the third, or most superficial, simply binds together its divided margins. The deepest sutures (those first passed) are tied last.

Simple Continuous Suture.—This is made by securing one end of the gut or silk with three knots at an angle of the wound. This terminal point of the gut or silk is held in a forceps by an assistant; the gut is now carried in continuous loops at a distance of two millimetres from the margin of the wound until it arrives at its other end, being drawn fairly tight. A little care is required that the consecutive stitches are adjusted with equal tightness.

Suture à Étages.—When the simple continuous suture is obviously insufficient from the size or depth of the wound to close it, this variation is suggested. When it has reached the widest portion of the wound, the thread is carried, not through the margin, but at some distance through the deeper tissues in the same

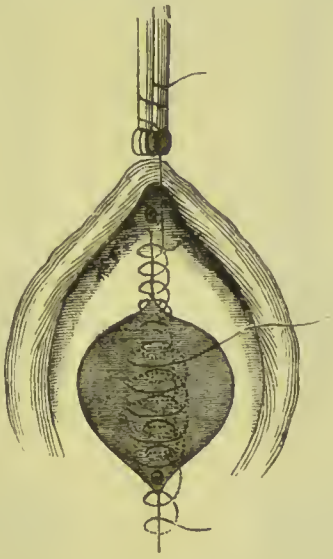


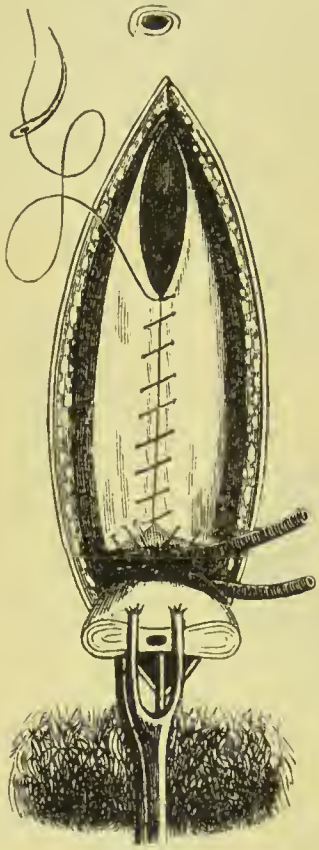
FIG. 304.—*Suture à Étages* (Pozzi). Three overlying sutures in the middle of the wound.

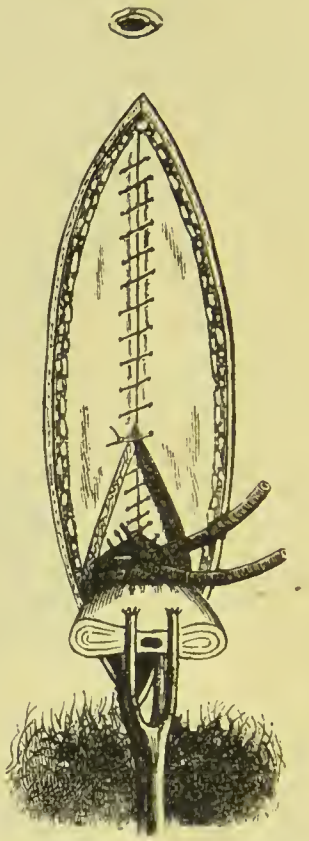
continuous fashion, thus diminishing its width for the extent desired by the operator. The needle is then again carried through the superficial structures, the wound being finally closed by a further continuation of the original suture. In some instances it may be necessary to insert two or three of these superimposed threads in the centre of the wound, in order to sufficiently contract the deeper tissues. Care must be taken not to draw the sutures too tightly, and thus to approximate too closely the separate stitches.

In passing the sutures, should the thread be either cut or broken, another is inserted at the same level, knotted, and the stitches are continued. Pozzi recommends, where the tension is great, the insertion of a few separate superficial stitches of silver wire or catgut.

The Mixed Suture.—This is a combination of the suture *à points séparés* (already described) and the continuous suture. Pozzi thus employs it in closing the abdominal wound after laparotomy: Having taken the usual precaution to protect the omentum and bowel, the margins of the abdominal wound are drawn together over the protecting sponge. The peritoneum alone is stitched, from the lower to the upper end of the wound, when, the sponge being with-

drawn, the suture is next carried through the muscular aponeurosis, the stitches being fairly close together. If required, the sheaths of the rect





FIGS. 305 and 306.—Suture of the Abdominal Walls after Hysterectomy. First stage of the continuous suture uniting the peritoneum (Fig. 305); second stage, uniting the musculo-aponeurotic structures (Fig. 306) (Pozzi).

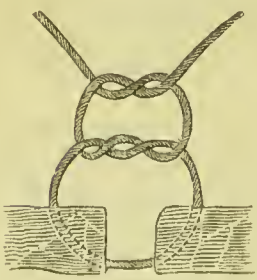


FIG. 307.—Surgeon's Knot.

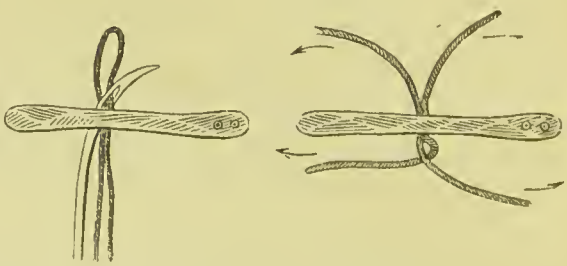


FIG. 308 and 309.—Ordinary Loop-knot for Pedicle. Fig. 308, Passing of loop before withdrawing needle; Fig. 309, Crossing of threads (Doran).

muscles are closed. When the second stage is completed, space being left at the lower margin of the wound for the pedicle with its elastic ligature, the skin and subcutaneous tissue at either side are brought together by a series of separate stitches about three centimetres apart, the needle entering at two or three centimetres from the edge of the wound. Finally, with a fine needle and

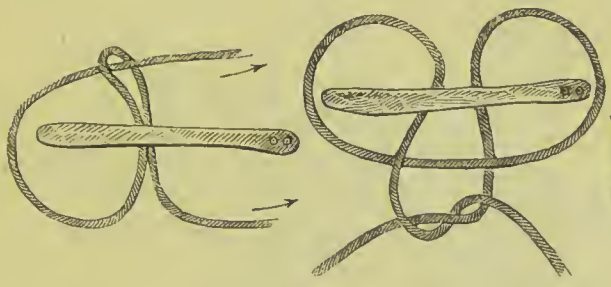


FIG. 310.
Bantock's Knot (Doran).

FIG. 311.
Tait's 'Staffordshire Knot.'

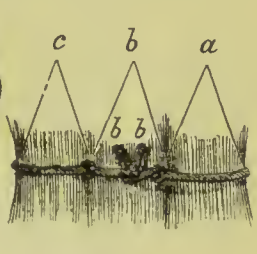


FIG. 312.
Chain Ligature on Pedicle, threads crossed (Doran).

thin catgut or silkworm-gut, a fine superficial suture is placed between each of the deeper ones, quite close to the edge of the integument. These latter are first tied, and then the deeper sutures. The third stage is now completed.

Pozzi prefers small rolls of iodoform gauze as quills in the use of the quilled suture; and in certain cases, after ablation of very large abdominal tumours,

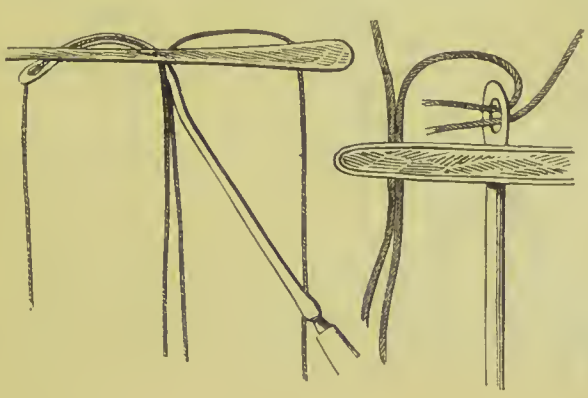
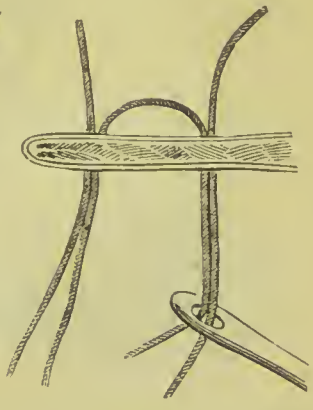


FIG. 313.—Chain Ligature being applied on a Membraneous Pedicle (Pozzi).



FIGS. 314 and 315 show the Method of making Consecutive Loops of the Chain Ligature (Pozzi).

he uses long and deep sutures, which are retained by rolls of iodoform gauze folded over the abdominal wall. They serve as efficacious means of compression, and tend to prevent hæmorrhage and serous exudation. The sutures may be removed in from five to six days.

Ligatures.—Pozzi makes some valuable observations also on ligatures. While silk is most generally used for ligaturing *en masse*, there can be little doubt that the abandonment of a large number of threads in the peritoneal cavity is not without its dangers. Some operators, as Vert, Martin, and others, relinquish silk altogether in favour of catgut for intra-peritoneal ligatures.

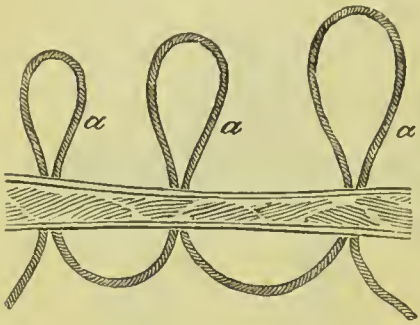


FIG. 316.—Loops of Chain Ligature *a*, *a*, *a* mark the points where these are cut for knotting (Pozzi).

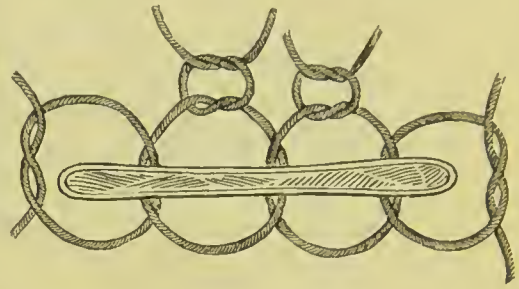


FIG. 317.—Showing the Threads crossed, knotted, and ready for tightening (Pozzi).

Fig. 307 represents the surgeon's knot made; Fig. 308, the method of tying the pedicle by piercing it with a double thread, which is then cut, and both ends knotted, as shown in Fig. 309; or the thread is passed through the loop, as is done by Bantock (Fig. 310); or the 'Staffordshire knot' (Fig. 311) of

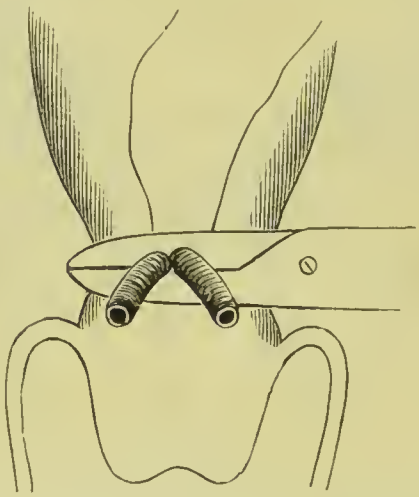


FIG. 318.—Forceps of Hégar for temporarily holding the ends of the Elastic Ligature before they are tied by the silk thread (Pozzi).

Lawson Tait is adopted. In this latter the pedicle is transfixed with a blunt-pointed or aneurism needle armed with a double thread. The needle is not withdrawn. Through the loop thus formed are brought the ends of a ligature carried loosely round the pedicle. The needle is now withdrawn, by which means the ends of the pedicle ligature are brought back through the pedicle and lie above their own loop. One of these ends is passed under the loop, and

both are tied firmly. They are again carried round the pedicle, and once more firmly tied.

Chain Ligature. — This form of ligature is useful in flattened pedicles, and in tying membranous adhesions. Figs. 310-317, show sufficiently the

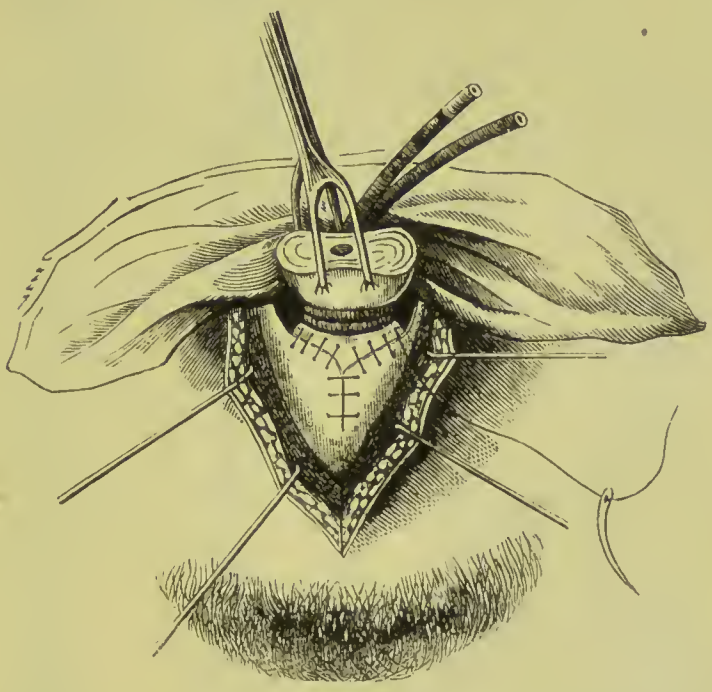


FIG. 319.—Suture of the Abdominal Wall in Hysterectomy, showing the peritoneum united round the pedicle inferiorly, which is secured by the elastic ligature (Pozzi).

method of making and tying these. With regard to the nature of the ligatures employed, Pozzi remarks that those made of kangaroo tendon, as has

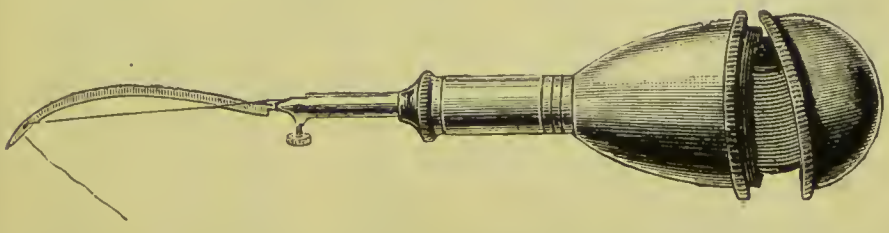


FIG. 320.—Greig Smith's Suture Holder and Needle. The handle of the needle contains the reel of silk, the thread of which runs through the cavity of the handle to the top of needle.

been recommended in America by Marey, or of the Ostiaks (used in Russia), have the advantage of offering the greatest resistance. Experiments show that a certain degree of vitality is maintained in the pedicle by the adjacent

vessels after ligaturing before the stump finally shrinks and is absorbed with the catgut. Silk, on the other hand, is first infiltrated with cells, then becomes encysted, and finally disappears; but it is more apt to cause secondary infec-

FIG. 321.—Reverdin's Needle, for use in closing the wound in ovariotomy. This needle effects a considerable saving of time.

FIG. 322.—Kaltenbach's Hollow Needle, used by Hégar for transfixing the pedicle. See p. 457.

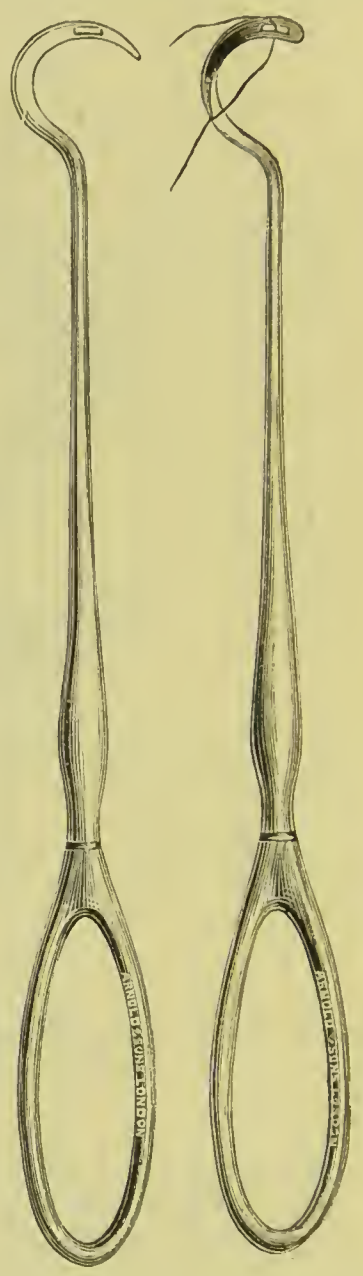


FIG. 323.—Deschamp's Needles (blunt and sharp), used for the uterine arteries.

tion. Fig. 318 shows the method of Hégar of passing a loop of silk behind the forceps that holds the elastic ligature surrounding the pedicle. This is tied tightly over the ends of the ligature, which are then cut short.

CHAPTER XXIII.

SURGICAL TREATMENT OF UTERINE FIBROMATA.

Summary of the more important Operative Procedures.*

We may classify the various operative procedures now practised for removal of uterine fibromata, dependent upon their size, character, and situation, as follows:

This abbreviated classification of operative procedures is introduced so as to prepare the student for the subsequent description of the details of the various methods referred to. The special indications for the application of the several operations, under the peculiar circumstances which demand them, will be found further on in the text.

Extra-peritoneal treatment of pedicle (extra-peritoneal cœlio-hysterectomy), p. 441.

Known as Hégar's Method. Delivery of tumour through abdominal incision, after ligature and division of broad ligaments if necessary. Treatment of pedicle by temporary elastic ligature, or the rope ligature of Tait. Fixation of pedicle covered by peritoneum in lower angle of abdominal wound, by means of serre-nœud and hæmostatic (various plans). By some the cautery, chloride of zinc, or perchloride of iron are applied to the stump. The pedicle may be treated by chain ligature or Staffordshire knot, or it may be tied in two halves with silk, in addition to the permanent elastic ligature of Hégar.

* Refer to the chapter on Cancer of the Uterus for the operative procedures, colpo-hysterectomy, colpo-salpingo-hysterectomy, and Freund's operation (also Jessett's and Doyen's methods of colpo-hysterectomy).

Intra-peritoneal method of Schroeder (intra-peritoneal cœlio-hysterectomy), p. 465.	The uterine cavity may or may not be opened. Extirpation of tumour, after application of the temporary elastic ligature, fashioning of pedicle by deep and continuous sutures, and covering it with the peritoneum. If the uterine cavity be opened (Olshausen), cauterize the angle of the wound by actual cautery or carbolic acid, previous to suturing.
Cœlio-vaginal pan-hysterectomy, Bardenheuer and Martin, p. 467.	Delivery of tumour through abdominal incision, ligaturing of broad ligaments in sections, and division of the ligaments to level of the internal os. Detachment of the bladder from the anterior surface of the uterus. Severing the anterior surface of the uterus from one broad ligament to the other as far as the subserous connective tissue, and further complete detachment of the bladder. Opening of the anterior and posterior fornix of the vagina. Ligaturing the uterine vessels at either side. The ligatures are drawn into the vagina. Tamponing of the vaginal wound with iodoform gauze.

Doyen's pan-hysterectomy (cœlio-vaginal salpingo-oöphoro-hysterectomy (see p. 481).	Delivery of tumour through the abdominal incision, and the drawing of it forwards and downwards over the pubes. Incision of the posterior wall of the cervix, and opening into the vaginal cul-de-sac. Incision of the peritoneum surrounding the uterus. Peeling off of the peritoneum from the tumour. Ligaturing the broad ligaments at either side from above. Removal of the tumour. Withdrawal of the pedicles of the broad ligaments through the vagina to the vulva. Inclusion (at both sides) of the pedicles by means of clamp forceps, which are placed through the vulva, and allowed to protrude. Closure of the peritoneal opening.
Pan-hysterectomy. Jessett's (cœlio-vaginal salpingo-oöphoro-hysterectomy) (see p. 485).	Jessett uses a bivalve obturator for stretching the vaginal roof, so as to serve as a guide for the finger and knife. Delivery of tumour through abdominal incision. Ligature and division of broad ligaments. Reflexion of anterior and posterior peritoneal flaps from tumour. Division of vagina on ends of obturator. Separation of the tissues by finger. Ligation of the uterine arteries. Removal of tumour. Suturing of peritoneum to raw surfaces. Withdrawal of sutures into the vagina, and consequent eversion of the peritoneal flaps. Closure of the abdominal wound.

Enucleation, pp. 473, 475.	Dilatation and incision of cervix. Removal by either bistoury, enucleator, enucleation scissors, or special curette. In enucleation for interstitial fibromas, the temporary elastic ligature is applied, the capsule is incised, drainage is maintained by the abdominal wound or by the vagina (Martin).
Mixed method of Wolfler-Hacker and Sanger, p. 478.	Covering of pedicle with peritoneum; attachment of pedicle to abdominal wound; and closure of the latter, with or without drainage. Sanger sutures the parietal peritoneum to the posterior surface of the pedicle, covering the latter with the visceral peritoneum. The pedicle is sutured by deep sutures. The abdominal wound is drained.
Myomectomy, p. 477.	*For pediculated fibromas;* the provisional elastic ligature is used, or the Staffordshire knot; the pedicle is covered with peritoneum; the uterine cavity is not opened; the pedicle is returned, and the abdominal wound is closed.
Morcellement, p. 475.	Preliminary dilatation or incision of cervix, deep incision of tumour; removal of mass, piece by piece, by means of forceps, scissors, and scalpel; tamponing cavity with iodoform; peritoneo-vaginal drainage by Douglas' pouch and vagina (Martin), or by the vagina only.

Decortication, p. 478.	Specially applicable to tumours springing from the broad ligaments and annexa. Peeling off of the peritoneal covering, resection of the tumour, closure of its bed by sutures; drainage either by the vagina or the abdominal wound, according to circumstances, such as the size of the tumour and its attachment or proximity to the uterus. This step may have to be completed by supra-vaginal hysterectomy. Where the vaginal cavity is opened, or that of the uterus, the vagina is tamponaded with iodoform gauze.
Salpingo-oöphorectomy, p. 488.	Removal of the uterine appendages with intra-peritoneal ligature. This operation is indicated when there is serious and recurrent hæmorrhage from certain cœlio-salpingo interstitial and intra-ligamentary tumours of comparatively small size, where we are not justified in advising the more serious abdominal operations.

Zweifel's Method.

We do not include in this brief tabular statement other operative proceedures, such as that of Zweifel, who combines the use of an elastic ligature with one of silk in securing the pedicle. On excising the tumour he cauterizes the uterine cavity with the thermo-cautery. The division of the broad ligaments is made transversely at a point at either side corresponding to the situation of the elastic tourniquet, hæmorrhage being controlled by means of a chain ligature applied along the divided ligament. When the tumour with the annexes has been removed, the peritoneal investment of the pedicle is secured by transfixing it with a Reverdin's or Kaltenbach's needle a short distance above the elastic ligature, and drawing a long thread of silk through, with which either half of the pedicle is tied. The ends of the ligatures with which the divided broad ligament at either side is tied are left long, and are

carried underneath those of elastic and silk on the pedicle. These long ends are used for covering the face of the stump with visceral peritoneum.

Baer's Method.

The Baer operation consists of passing a single silk ligature through the broad ligament near the cervix, and then transfixing the ligament near its outer surface and tying. In order to prevent reflux from the uterus, a stout pedicle forceps is made to grasp the broad ligament below the tube and ovary, and then the ligament is severed just below the forceps, the incision being carried close to the edge of the tumour. A second ligature may be applied to the broad ligament lower down, if deemed necessary, and the process of ligation and cutting be repeated on the opposite side. The knife is then carried lightly around the tumour an inch or two above the peritoneal reflexion of the bladder in front and behind, and the peritoneum stripped off with a scalpel handle for the purpose of making peritoneal flaps. The next step is the ligation of the uterine arteries. This is accomplished by passing the ligature through the broad ligament, outside of, but close to, the cervix, avoiding the ureters. The uterus is then amputated, and the stump (trimmed and made as small as possible) immediately recedes upon being released, and is buried out of sight by the peritoneal flaps which cover it like elastic bands. The peritoneal flaps are united by Lembert sutures, if necessary. The cervix is thus allowed to resume its natural position, and is devoid of a single ligature or suture in its tissues. Nothing whatever is done to the cervical canal. Nor has Baer found it necessary to use the temporary elastic ligature about the cervix. The author believes his method of operating comes as near being technically correct as possible, for the following reasons:

1. It secures against hæmorrhage, because the bloodvessels are ligated outside the muscular tissue of the cervix; and against sloughing, because these tissues are entirely free from a contracting ligature.

2. It removes all of the supra-vaginal tissue, without opening the vagina, thus allowing the cervix to remain attached and *in situ*, to maintain its position as the keystone of the arch, and preserve the strength and anatomical shape of the lower part of the abdominal cavity.

3. The raw end of the stump is in contact with the raw surfaces of the surrounding structures, deep in the pelvis and covered by the raw edges of the peritoneal flaps, which press firmly upon these tissues, and immediate union doubtless occurs.

4. The danger of contamination from sloughing pedicle, open vagina, or drainage-tube, does not exist.

5. The anatomical relations of the parts are not so disturbed as in other operations, and the dangers of hernia, fistula, and other unpleasant sequelæ are absent.—*American Journal of Obstetrics*, October, 1892.

CHAPTER XXIV.

SURGICAL TREATMENT OF UTERINE FIBROMATA (continued).

Extra-peritoneal Abdominal Hysterectomy.

The Steps of the Operation of Extra-peritoneal Abdominal Hysterectomy.—In a work of this size it is obviously impossible to enter very minutely into the details of all the various modes of operation for hysterectomy adopted by different operators. I must be content with a description of the operations by both the intra-peritoneal and extra-peritoneal methods.

Greig Smith divides extra-peritoneal measures into three groups: (*a*) Those in which no uterine tissue whatever is left; (*b*) those in which cervical tissue only is left; (*c*) those in which portions of growth, as well as the uterus, are left. He insists on limiting all intra-peritoneal treatment to those cases in which there is complete amputation of the entire uterus, and no particle of uterine tissue left, the vagina being closed.

With regard to the two great subdivisions of the operation of hysterectomy—viz., by the intra-peritoneal and the extra-peritoneal methods—Pozzi, who is an advocate of the extra-peritoneal operation, thus classifies the indications for the several methods:

(*a*) For pedicles in which there is little risk of bleeding, and when the uterine cavity is not opened, the silk or catgut ligature or suture by the intra-peritoneal method of Schroeder is used.

(*b*) For non-bleeding pedicles, when the uterine cavity is opened, if they be sufficiently long, he advises the extra-peritoneal method of Hégar; for shorter ones, the mixed method of Wölfler-Hacker or of Sänger.

(*c*) In the instance of bleeding pedicles, if they be sufficiently long, Hégar's method he considers best; for shorter ones, the mixed method of Sänger, with the elastic ligature. If the pedicle be very short, intra-peritoneal elastic ligature (Olshausen) or pan-hysterectomy (Bardenheuer).

(*d*) In the case of tumours without a pedicle, interstitial or submucous, which are easily enucleated, and grow from the lateral part of the uterus, he recommends enucleation and suture of the capsule by the intra-peritoneal method of Martin. For similar tumours, when the cavity of the uterus is opened during enucleation, he approves of extra-peritoneal supra-vaginal hysterectomy (Hégar).

(*e*) Tumours without a pedicle, embedded in the cellular tissue of the pelvis, or included in the broad ligament, if small and easily enucleated, he decorticates and completely sutures the bed of the tumour, and does not use drainage. If it be a large tumour, which can be easily removed from the abdomen, and which leaves a large bleeding cavity, he decorticates and partially resects it, using superficial sutures. He drains by the vagina (Martin) or by the abdominal wound. If necessary, he tampons by means of iodoform gauze. For the same type of tumour, attached intimately by vascular connections to the side of the uterus, he resorts to supra-vaginal hysterectomy.

The Operation—Management of Adhesions, Bleeding Vessels, and Wounds of Ureters.—The preliminary incision is made, varying in length according to the size of the tumour to be removed. It may subsequently have to be prolonged upwards by scissors or bistoury. It is similar to that made in ovariotomy. The surgeon keeps exactly in the middle line, avoiding the rectus sheath. If he do open the sheath of the rectus, he may either complete the incision by cutting directly through the muscle, or he can pass a grooved director in towards the middle line to guide him to the linea alba. Wells' pressure forceps are now applied to the bleeding points, and all hæmorrhage is arrested by forcipressure or ligature. It is wise to make it not longer than four inches, and not to approach too closely to the symphysis. The peritoneum is opened by holding it up with a dressing forceps and dividing it with a scalpel laid horizontally beneath the forceps. It is next divided on the finger or a flat-grooved director to the necessary extent. A few catch forceps are then applied to its margins at either side, which are thus held readily aside. The tumour is next examined with two fingers introduced into the wound, and its extent is carefully determined; its depth in the pelvic cavity, and the extent of the adhesions (if any) which are present, are ascertained.

The next step is the separation of the parietal adhesions if

they be present; this may be done with the finger. Care must be taken, in cases where there have been previous attacks of general peritonitis, lest the bowel be so adherent to the peritoneum that it runs the risk of being opened when the latter is incised.

In a case of removal of a sanguineous cyst from the broad ligament which I operated upon recently, the firmness of the adhesions between the bowel and the peritoneum was such that it could not be detached, and I had to find a lateral portion of the peritoneum lower down, in which the opening was made.

Small bleeding points are treated by torsion, and any bleeding portion of separated adhesion or membrane is secured by a fine gut ligature. Petersen has devised a rubber balloon for placing in the rectum or vagina, by which, when it is inflated, the pelvic viscera are brought better into view. But when this

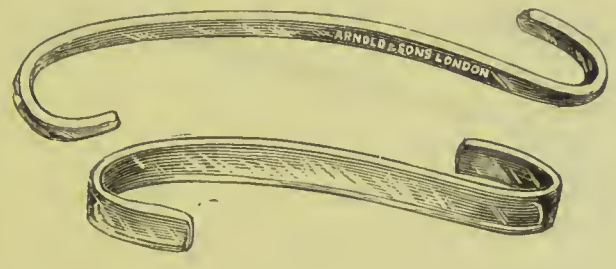


FIG. 324.—Author's Glass Retractors, two sizes. These lie flat on the abdominal wall, and can be held with tapes.

s necessary, the inclined decubitus of Trendelenburg is preferable.* The manipulation of pelvic, omental, and intestinal adhesions may demand time, and call for the greatest skill and delicacy on the part of the operator. This no book can teach, nor detailed description ensure. Should the intestine be inadvertently or unavoidably opened, it must be immediately closed by suture, and that of Lembert should be chosen in preference. If the tumour be very large, and the adhesions be found to be more extensive than was anticipated, the incision may have to be prolonged at the side of the umbilicus as far as the xiphoid appendix. Vesical adhesions

* See p. 47 for position and table of Delajenière.

offer considerable difficulties. In separating these, it is well to pass a sound into the bladder as a guide. Should the bladder wall be wounded, it must be closed by gut or fine silk sutures, as in the instance of the intestines. Such cases always necessitate drainage. It may be found that, owing to the extent of the adhesions, shortness of pedicle, and depth of tumour, it is impossible to enucleate it. Then the tumour has to be dealt with by one of the other methods we shall refer to. In clearing the tumour in front, the ureters may be

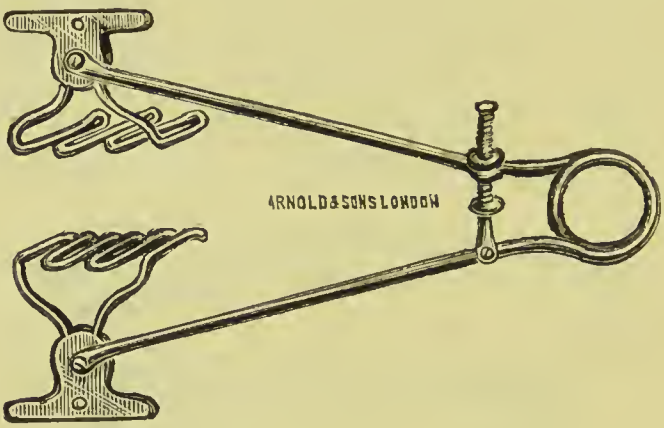


FIG. 325.—Maunsell's Self-holding Retractors.

wounded. The degree of laceration and displacement of the tube must influence the course to be pursued. Some surgeons have performed immediate nephrectomy of the corresponding kidney. Pozzi advises for simple rents, and when the ureter is still in position, that a fine ureteral catheter or sound should be passed into the ureter from the bladder as far as the tear, which is then carefully sutured with fine gut. (Consult chapter on the 'Surgery of the Ureters.')

In the case of more severe lacerations, he advises the establishment of a lumbar ureteral fistula with the end of the upper portion of the ureter. A ureteral sound is then applied, and the peritoneum is antiseptically tamponned to prevent the infiltration of urine, to a level with the vesical end, which is tied and fixed to the lower end of the abdominal wound. Nephrec-

tomy may have to be subsequently performed. See chapter on Ureteral Surgery for Howard Kelly's method of treating injured ureters.

If there be danger of wounding the bladder, which is sometimes expanded over the face of the tumour, a male sound should be introduced, which will help as a guide to the position of the viscus. It must then be separated from the tumour by the thumb or finger nail. Keith met with a case in which the bladder reached to the umbilicus.

It may be necessary, under such circumstances, to detach the connections of the bladder with the uterus, having opened the vesico-uterine cul-de-sac.

Hæmorrhage during operation must be treated at the time by forcipressure and ligatures. In the greater number of cases it is preferable to rely temporarily on the former, so as not to delay the rapidity of the enucleation. Properly exerted compression by means of sponges, continued according to circumstances, is a valuable means of stopping general oozing; but it may be necessary to resort to deep suture or the cautery. Tait has advised the use of the solid perchloride of iron in certain cases, where the bleeding resists the ordinary means of arrest. *Mikulicz tampons the part in the following fashion:* He carries a square of iodoform gauze to the bottom of the wound. The square is seized in its centre by a forceps, and into the hollow thus formed are packed smaller tampons of iodoform wool, as also around the square of gauze itself. The threads of silk are knotted in the usual manner with the number of knots which indicate the order in which the tampons are to be removed.

We have already indicated (see chapter on sutures, pp. 425-434) various methods for arresting hæmorrhage by means of sutures, as also Pozzi's plan of using the iodoform quill suture. It is better, in all cases where the hæmorrhage is persistent from the pelvic basin, either to make use of the inclined position, or, by drawing the intestines well out of the way, and protecting these with warm sponges, to get a good view of the bleeding

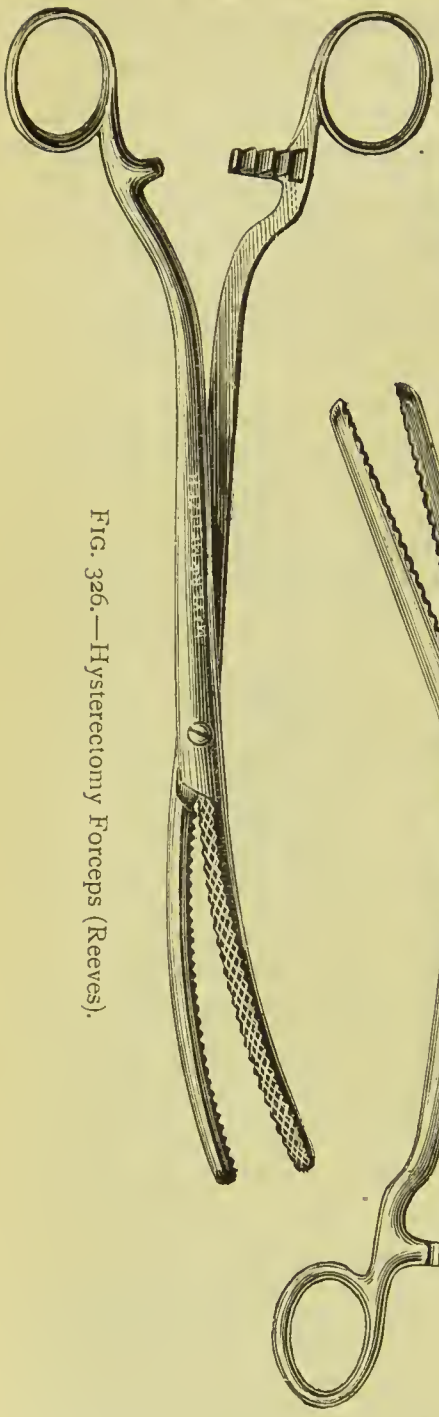


FIG. 326.—Hysterectomy Forceps (Reeves).

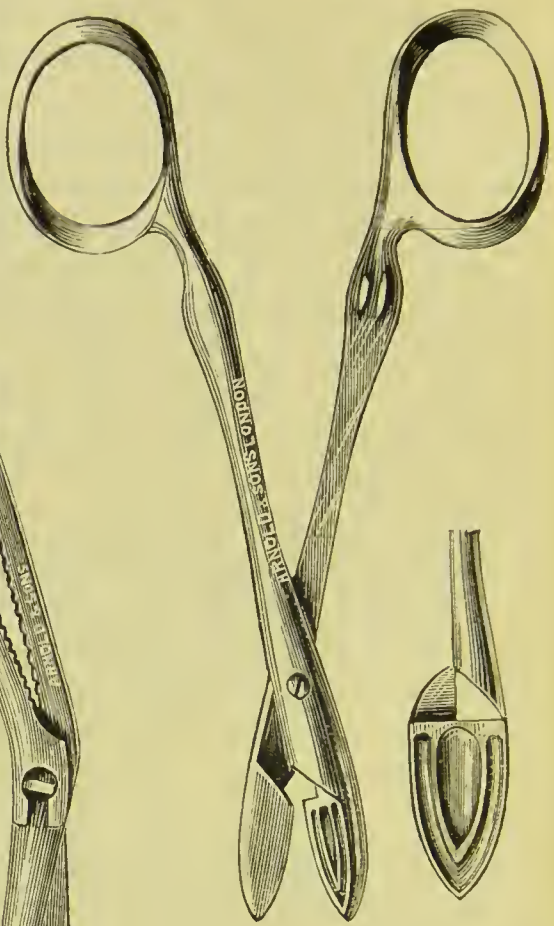


FIG. 328.—Greig Smith's Pressure Forceps.

FIG. 327.—Nickel-plated Broad Ligament Forceps (Arnold).

spot. This object is facilitated by the use of a large laryngeal reflecting or electric mirror, which directs the light on to the

wound, and a further view, as well as temporary control, is secured by the use of the clamp forceps, and thus, when the parts are drawn forward, the proper position for sutures is more readily determined upon.

The Withdrawal of the Tumour.—This is frequently a matter of considerable difficulty. Tait's corkscrew (Fig. 329), which is screwed into the substance of the tumour, facilitates very much the drawing of the mass or masses forwards through the abdominal opening.

This *extrusion* of the mass has to be conducted with care. Undetected adhesions may be torn through by roughness, and the attached viscera thus injured. Also, the less bruising

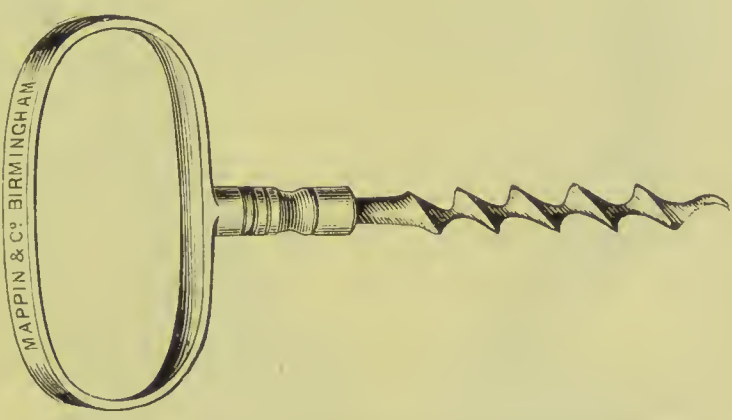


FIG. 329.—Tait's Screw for withdrawal of the Tumour.

of the parietes there is, the better. The size of the mass may demand further enlargement of the incision, or it may have to be dealt with by *morcellement* (see p. 475).

If the delivery of the tumour be prevented by its depth in the pelvis, or associated myomatous growths between the layers of the broad ligament, the latter must be divided and ligatured. To effect this, a broad ligament pressure forceps is made to embrace the ligament at either side of the uterus outside the ovary and Fallopian tube. This may be allowed to remain on until the tumour is removed. Next, a silk ligature is carried below the point of the forceps through the ligament close to the uterus, and while it is tightened, the broad ligament is

divided close to the blades of the forceps. The advantage of this synchronous and gradual method of ligation and section of the ligament, as Greig Smith points out, enables us to most effectually secure the tissues, in which are included the ovarian artery and its anastomoses, with the uterine vessel, as also the accompanying venous plexus, often more formidable to deal with than the arteries. This process may have to be repeated

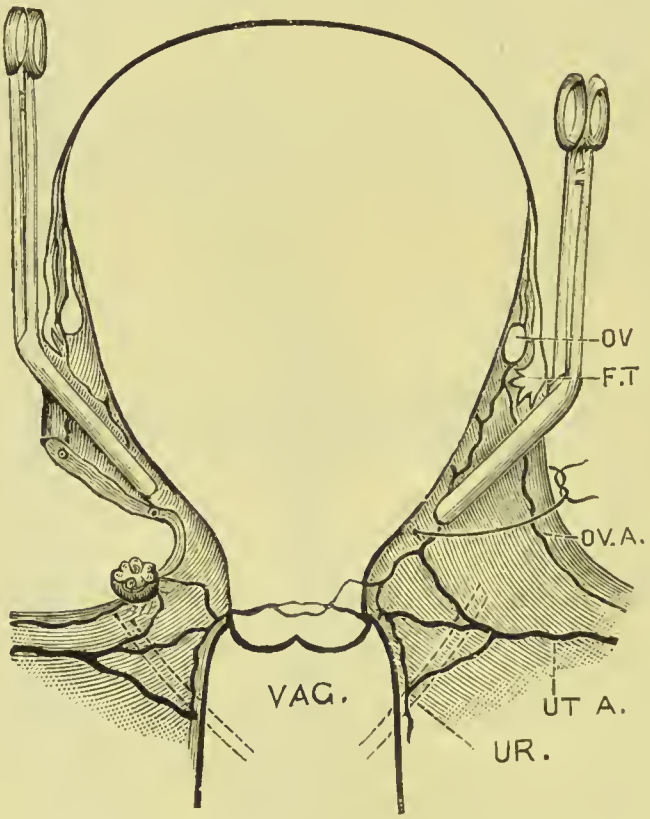


FIG. 330.—Ligation and Division of Broad Ligaments in Hysterectomy for Myoma. Forceps are placed on both ligaments outside the ovaries and tubes; on the right side the ligature is placed; on the left it is tied and the ligature is divided (Greig Smith).

a few times lower down in the pelvis. The same steps are taken with the broad ligament of the opposite side.

At other times two pressure forceps may have to be applied at either side, and the ligament divided between them, the outer pair being allowed to remain until after the tumour is

delivered, when the ligament is ligatured. This is, broadly speaking, the method followed in ordinary cases. But of course the special difficulties due to the attachments of the tumour, its depth in the pelvis, the stretching of the broad ligaments, and the displacement of the ureters, must demand the adoption of different plans suitable to the individual difficulties met with in each case. This method of dealing with the broad ligaments and the uterine vessels has the high authority of Greig Smith for its recommendation.

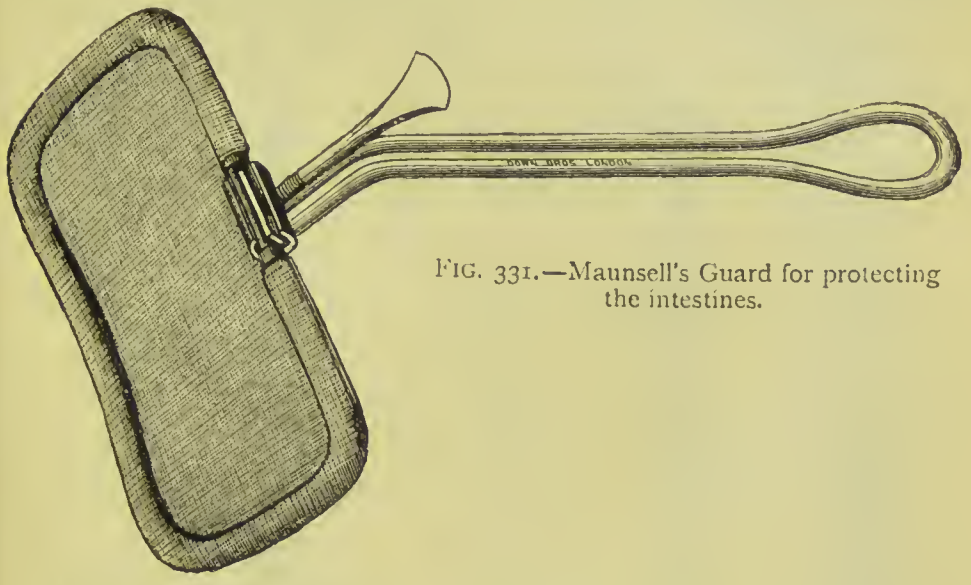


FIG. 331.—Maunsell's Guard for protecting the intestines.

Management of the Pedicle.—When the tumour has been withdrawn from the abdominal cavity, if its pedicle permit of this being completely done, the latter is temporarily secured by a strong curved clamped forceps. The intestines are meanwhile carefully protected by sponges, and all bleeding-points are secured. The means already indicated to control hæmorrhage are also taken. In some instances it is a matter of great importance to protect the peritoneum and intestines, when, in consequence of considerable delay or the size of the tumour, they are exposed or extruded. As a rule the usual flat sponges are sufficient for the purpose. Maunsell devised a diaphragm—a frame of copper wire covered with rubber tubing, over which several layers of aseptic gauze are stretched. To this Watson Cheyne

has added a handle. The diaphragm, when inside the parietes, can be kept in position by means of two threads carried round the patient's body. Should the intestines be extruded for any time, the utmost care must be taken to prevent chilling, and

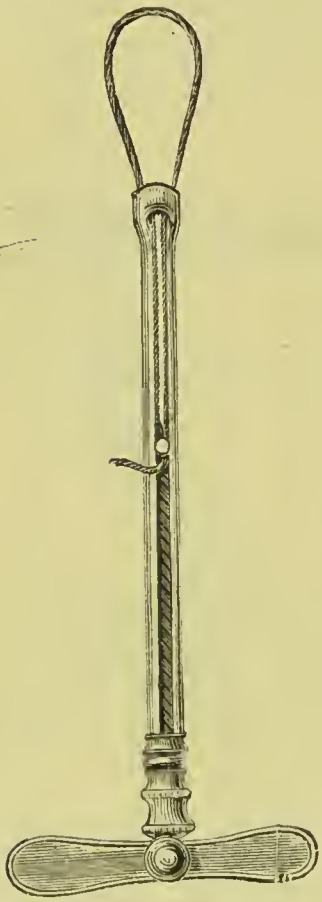


FIG. 332.—Kœberlé's Serre-nœud.

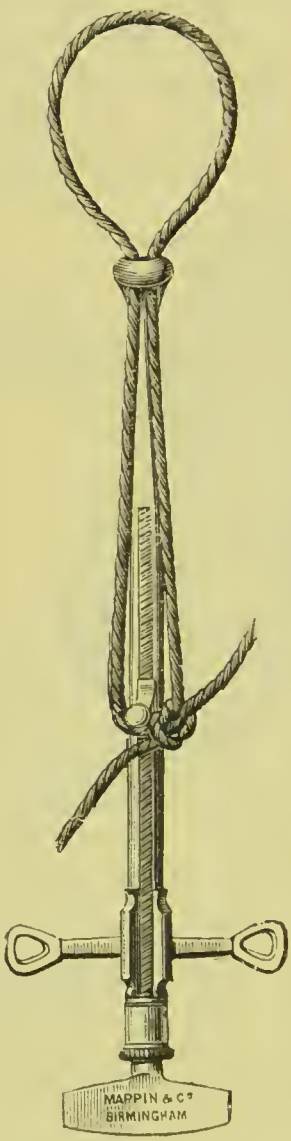


FIG. 333.—Tait's Temporary Rope Tourniquet.

the effects of evaporation. They should be covered with a sheet of gutta-percha, and warm cloths wrung out of an antiseptic solution. Such a duty should be entirely delegated to one assistant. The pedicle is now surrounded, and the

temporary elastic ligature or the rope of Tait is applied, as shown in Fig. 335.

This mode of compression is specially adapted for a short and thick pedicle, which can be also treated by the loop ligature of strong twisted or plaited silk. With a more slender

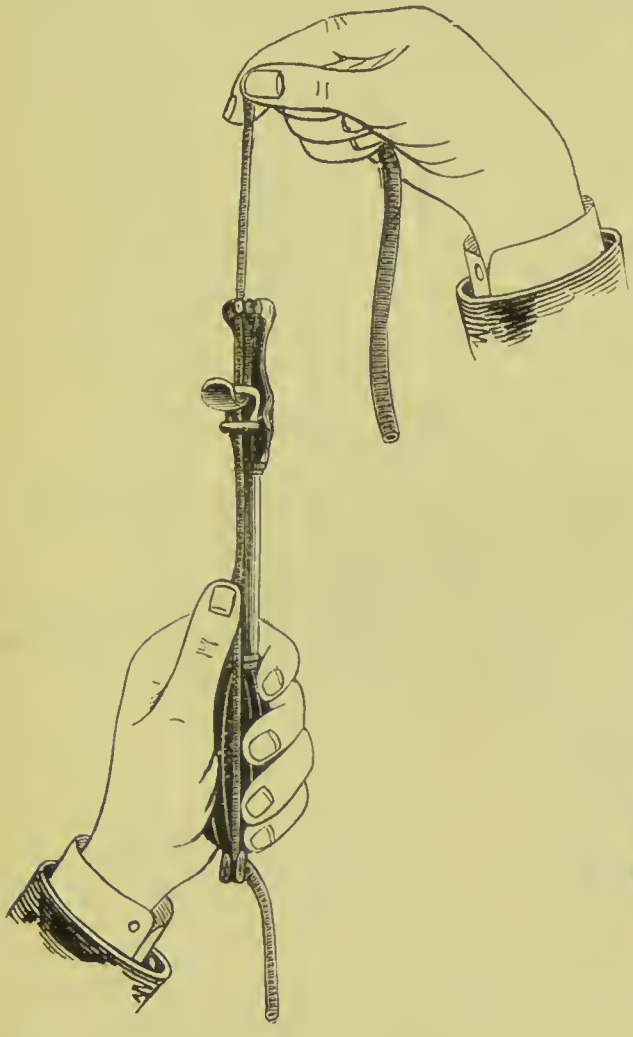


FIG. 334.—The Tourniquet of Pozzi, showing the elastic ligature before its application round the pedicle, drawn through the forked mouth of the instrument in which it is held.

FIG. 335.—The elastic ligature carried twice round the pedicle and held by Pozzi's tourniquet. The upper end of the appliance is readily removed from the handle, and this holds the ligature temporarily in its place.

pedicle, the Staffordshire or other knot may be sufficient. The divided surface is then examined for any bleeding-points. The annexa may be included in the ligature. But it is preferable to apply two clamp forceps to the broad ligament and to divide it obliquely between them, the pedicle of the broad ligament being secured by a chain ligature of silk or gut.

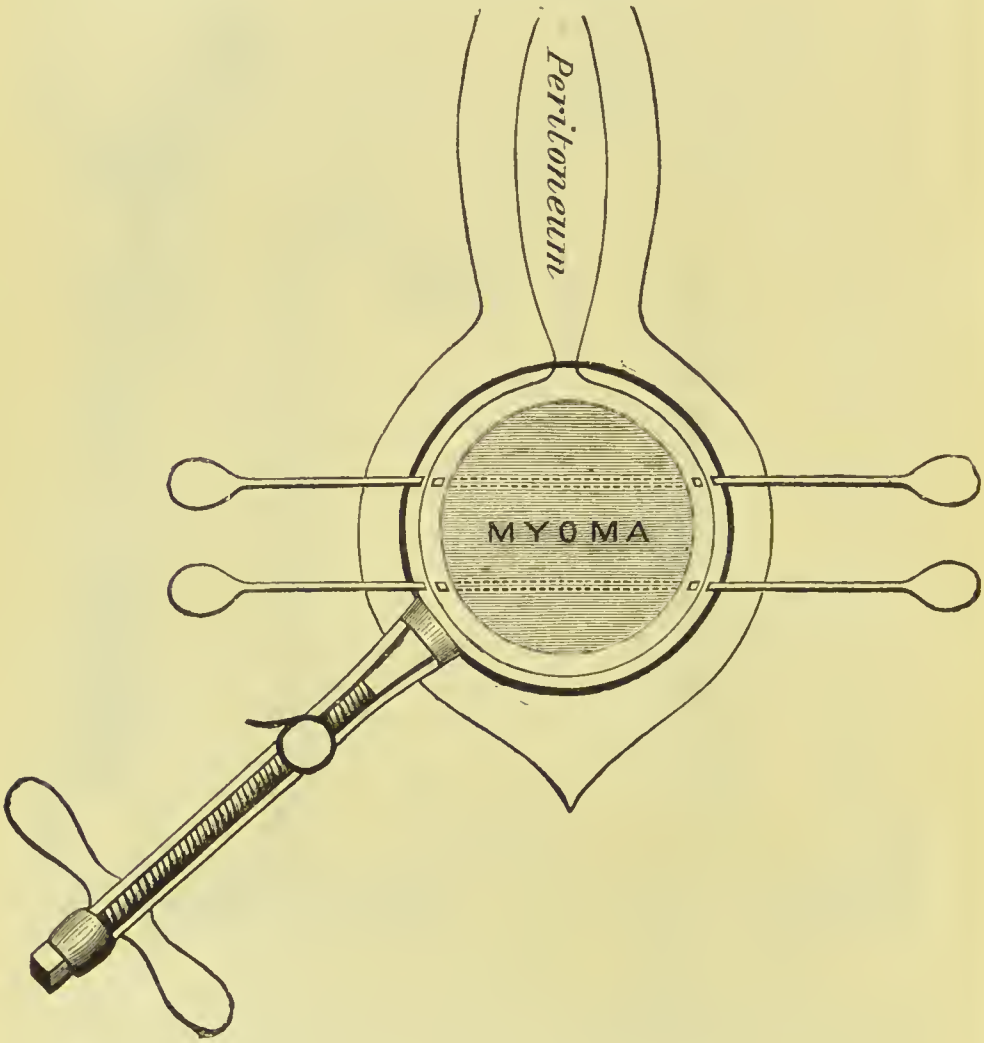
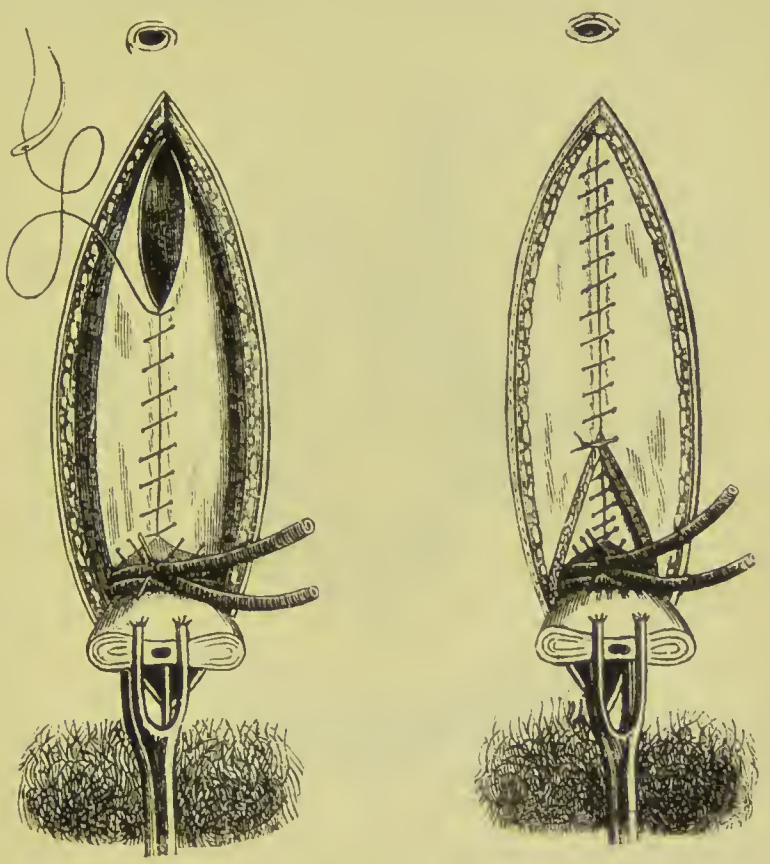


FIG. 336.—Taylor's Method of Clamping the Pedicle. Diagrammatic representation of stump with pins and serre-nœud in position (J. C. Taylor).

Certain names are associated with the most important advances made in the various operative steps for the removal of fibroid tumours from the womb. Thus, those of *Kœberlé*

and *Péan* are connected with the use of the 'serre-nœud' *Schroeder's* with the intra-peritoneal operation and ligature of the pedicle; *Kleberg* and *Hégar's* with the employment of the temporary elastic compress, and the use of the elastic ligature of the pedicle.

Taylor's Method of Clamping the Pedicle. — Taylor of Birmingham, having drawn the bulk of the tumour outside



FIGS. 337 and 338.—Suture of the Abdominal Walls after Hysterectomy. First stage of the continuous suture uniting the peritoneum (Fig. 337); second stage, uniting the musculo-aponeurotic structures (Fig. 338) (Pozzi).

the peritoneal cavity, detached adhesions, ligatured the broad ligament, and separated the uterine attachments, thus deals with the pedicle. He passes transfixion pins through the peritoneum from the right side of the incision through the base of the pedicle, through the peritoneum on the left side of the incision, *each pin only transfixing the peritoneum at*

either side. The clamp wire is now carried beneath the pins, the edges of the peritoneum immediately above and below the stump are caught by forceps, the points of which are included in the loop of wire. The parietal peritoneum is thus encircled by the clamp all around the pedicle, in a strictly extra-peritoneal fashion, only a single layer of peritoneum intervening between it and the pedicle. The tumour is now cut off, the incision closed, and the stump treated with solid perchloride of iron and iodoform.

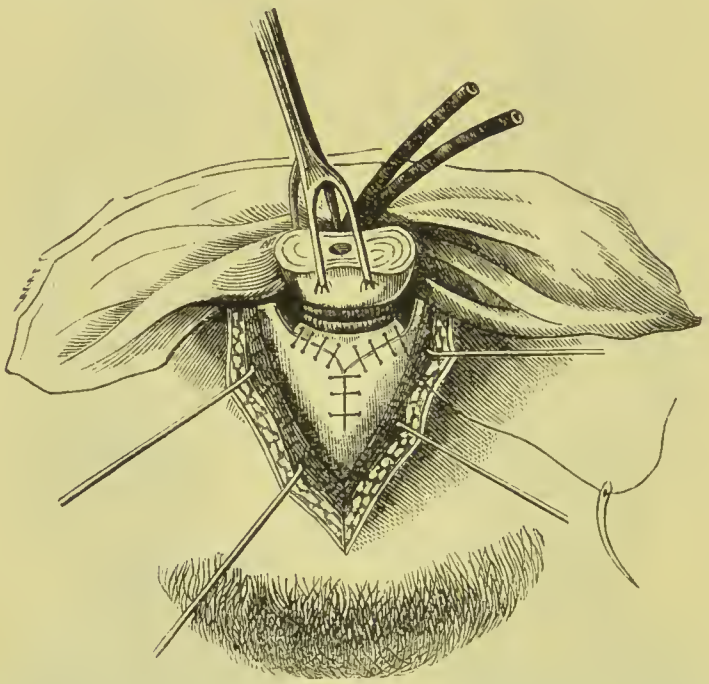


FIG. 339.—Suture of the Abdominal Wall in Hysterectomy, showing the peritoneum united round the pedicle inferiorly, which is secured by the elastic ligature (Pozzi).

I have referred to Pozzi's elastic tourniquet for application of the temporary ligature to the pedicle. Figs. 339 and 340 represent it in two stages of its application. The rope of Tait has the advantage of being less liable to slip. Tait's needles, with which he transfixes the pedicle above his serre-nœud, are shown in Fig. 342. Where there is danger of retraction of the pedicle, in consequence of its shortness, these protected needles will be found most convenient. With the serre-nœud soft

'delta' wire is used. The flat surface of the needle-shield rests on the abdominal wall, and it should be inserted before the pedicle is cut away. It must be remembered that occasionally the pedicle of the broad ligament has to be either drawn round it so that the constricting wire shall embrace the separated peritoneum, or be fixed to the parietal wound by sutures. In this latter case the peritoneum excludes the sloughing pedicle from the general cavity.

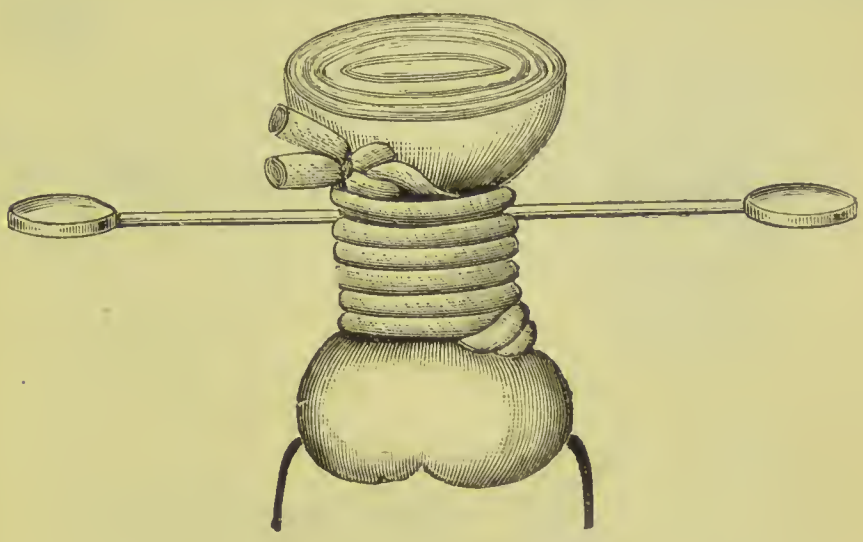


FIG. 340.—Elastic Ligature applied to Pedicle (Greig Smith).

It is needless to say that in all cases scrupulous care has to be taken that no portion of omentum or intestine is included in the ligature. When the pedicle has been thus secured, the tumour is cut off at a sufficient distance from the ligature, and the stump is brought to the inferior angle of the wound, where it is fixed. It is better, if possible, to avoid the use of either the cautery or perchloride of iron to the pedicle. Lawson Tait has recently again advocated the use of the actual cautery to the pedicle in the intra-peritoneal operation, and has devised a special cautery for this purpose (see Intra-peritoneal Operation). Either application can only be necessary when there is a probability of obstinate bleeding, or when the uterine cavity is opened.

Hégar and Kaltenbach resorted to chloride of zinc; others habitually apply iodoform. Bantock and Greig Smith use dry absorbent wool, which the former has found mummifies the tissues, rendering them hard and dry. This, with the use of iodoform, in a large number of cases answers every purpose. Tait, however, still uses the perchloride of iron.

FIG. 341.—Pedicle Pin.

FIG. 342.—Tait's Pedicle Pins.

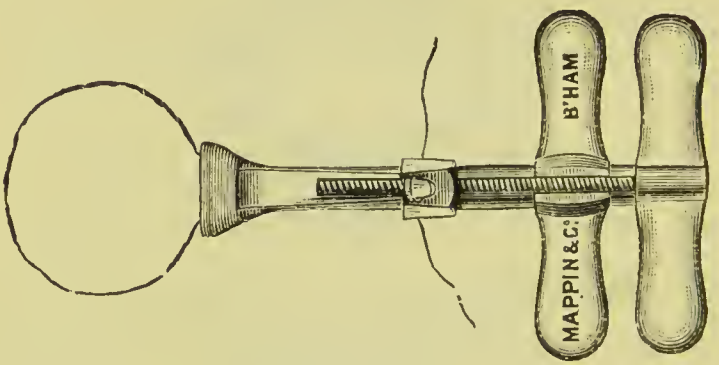
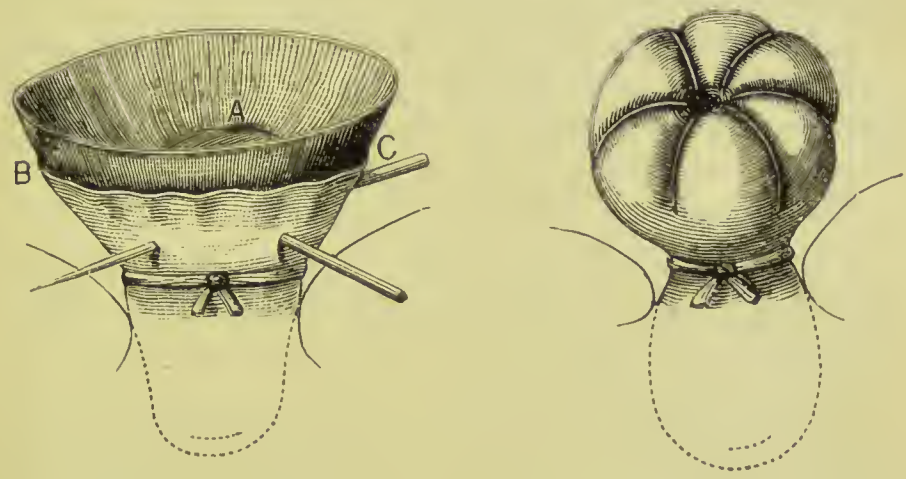


FIG. 343.—Tait's Serre-nœud.

Doléris fashions the stump with a scissors or bistoury, hollowing it out or removing the fibrous nuclei which are often contained in it, forming thus a sero-muscular collar, and treating the excavated depression with cautery or iodoform. The serous edges of this cup are then brought together and inverted by separate sutures of silk, which give it, when the needles are removed, the appearance of a champagne cork. The pedicle so fashioned is fixed by circular continuous or interrupted suture, and the peritoneum is thus isolated. An antiseptic

powder of iodoform, or iodoform and tannin or salol, is used to prevent sepsis.

The temporary elastic cord has a diameter of five millimetres. Pozzi prefers the solid kind, inasmuch as it is stronger, and more easily kept aseptic. In applying this it has to be well stretched, and carried twice round the circumference of the pedicle. The transfixing needle of Hégar for carrying an elastic or other ligature through the pedicle is shown in Fig. 322. The sharp point of the needle screws off. The



FIGS. 344 and 345.—Doléris' Treatment of the Pedicle—'Champagne-cork' Stump (Bonnet and Petit).

shank of the instrument is hollow, and into this the ligature can be drawn. This is in reality the needle of Kaltenbach. Hégar pierces the thick pedicle with a double elastic ligature, and then ties it in separate halves. Pozzi prefers to encircle the pedicle with the elastic cord, and tie it with silk, as has been already described (Fig. 319). It is advisable, for the sake of additional security, to carry the ligature for a second time well round the circumference of the pedicle.

When the serre-nœud is applied, it is well to watch for a few days that the wire does not loosen, and it may be necessary to tighten it up by a few turns of the screw from day to day. Greig Smith, however, among others, prefers not to

* See p. 433 for Greig Smith's suture-holder and needle.

thus lessen the blood-supply, as he believes that the slough is cast off more quickly when this latter is not diminished. He removes the clamp on the third or fourth day. Some operators at each dressing remove dead particles of the pedicle.

In dressing the abdomen, the bandage should not be applied too tightly, in view of its causing adhesions. Another application is that recommended by Freund—viz., three parts of tannin, one of salicylic acid. Pozzi recommends one part of the powder of iodoform with five of tannin.

Tait has devised some most convenient means for arresting hæmorrhage and securing the pedicle. Kœberlé's serre-nœud (Fig. 332) he has modified by altering the sliding and fixing button into claws, as shown in Fig. 343. This affords an extremely ready way of fixing and tightening the wire. Tait's temporary rope compressor (see Fig. 333), instead of the temporary elastic tourniquet of Pozzi, will be found perhaps the readiest of all means for most rapidly compressing and securing the pedicle.

After-Treatment.—Everything having been completed, the patient is placed in bed with a pillow under the knees, hot bottles are kept to the feet, and the administration of a small amount of stimulant may be needed. The food is limited to the use of barley-water for the first twenty-four to thirty-six hours, and not until the third day is any milk given. In some cases it may be necessary to give sips of iced champagne occasionally, and resort may be had to small quantities of one of the concentrated meat essences, such as Brand's or Valentine's, Johnson's or Viking's, meat jelly, and Bovinin. Not until after the fifth day should anything solid be given. By general consent the use of opium is now abandoned; this is principally from its effect in preventing intestinal action. If there be a tendency to tympanites, turpentine can be administered by enema, and the rectal tube may be worn to assist in the escape of flatus, or, on the other hand, it may be passed three or four times in the day for the same object. About the sixth day a light

enema may be used, or a saline purgative be given. One of the most valuable means of treating the constipated bowel, relieving tympanitic distension, and the associated pain, is to give in a little water one teaspoonful of sulphate of magnesia every hour for five or six doses. This is a plan recommended by Balby, and I have on several occasions found the greatest benefit accrue from following it. The bladder has to be carefully attended to for some days following the operation. The removal of the abdominal sutures will depend on circumstances.

The removal of the first dressing must depend on circumstances and the progress of the case after operation. It is often not necessary to disturb it for six or eight days. The time of separation of the necrosed pedicle varies; usually it occurs about the tenth day, but it may be delayed as far as the twentieth.

With regard to the serre-nœud, the pins are left after the wire is removed, otherwise the stump is apt to retract inside and give considerable trouble. The raw granulating depression remaining after the separation of the slough is dressed with drying (antiseptic) powders, such as those of boric acid, iodoform, salicylic and tannic acid. It is well to insist on the dorsal decubitus until after the sixth day.

There are certain complications which may modify the course of the after-treatment. Pain and nervous excitement demand the subcutaneous use of morphia, or morphia and atropine. Secondary internal hæmorrhage, indicated by the usual symptoms of pulse and colour, will call for reopening of the abdominal wound, in order to search for the source of the hæmorrhage and the ligation of any bleeding vessels. Stimulating injections per rectum should be administered. If there be threatened syncope, sulphuric ether is given subcutaneously. Morphia and atropine are subcutaneously injected at intervals. But it is not wise to rush too hurriedly to the employment of morphia. 'The routine employment of morphia,' says Greig Smith, 'is to be condemned.' The com-

plications which are apt to arise are 'better met by a system unimpregnated with morphia.' And as to the troublesome vomiting, which is so often made worse instead of better by the different remedies resorted to to check it, the same distinguished and sagacious surgeon remarks: 'It' (*i.e.*, the vomiting of peritonitis) 'is not of a sort to be controlled by medicine; indeed, it is doubtful if it be desirable to check it.' The vomiting, as he points out, frequently relieves the distended bowel of its liquid and gas. He has found 'the administration of as much fluid as the patient will drink—soda-water, weak tea, or simple warm water—is followed by the evacuation of bilious fluid and gas, making the patient comfortable in a few hours,' and Kussmaul's treatment of washing out the stomach has given him on a few occasions good results.

Tait advocates in certain cases of tympanites, with intestinal inaction and constipation, the administration of a saline purge.* There can be no question that, as Greig Smith says, in some of these cases a seidlitz-powder or dose of sulphate of magnesia 'acts like a charm' (see p. 459). It relieves the pressure and distension due to the accumulated fluid and gas. Opium generally has to be avoided.

Obstruction by Strangulation.—Bonnet and Petit point out the care with which the peritonitis of septic infection has to be diagnosed between that complication and intestinal obstruction, or possibly strangulation. Both have many symptoms in common. If there be strangulation and consequent obstruction, there is greater tympanites, at the onset more elevation of temperature, and the vomited matter is apt to be fæcal. There is likewise considerable sensitiveness of the abdomen.

Localized peritonitis, setting in early after the operation, may bring about occlusion or strangulation of a distant portion of intestine. The authors quoted dwell on (*a*) auscultation of the cæcum during the passage of a rectal hernia (Briquet and Velpeau); (*b*) meteorismus of the strangled loop of intestine,

* See p. 459.

recognisable to the view, and by palpation or percussion (Wahl); (*c*) peristalsis of the intestine, limited to the obstructed portion of the bowel (Schlange).

Martin of Birmingham thus tabulates the causes of intestinal obstruction:

(1) Inclusion of intestine between the lips of the abdominal wound.
(2) Transfixion of intestine while suturing the wound.
(3) Constriction of the rectum by utero-sacral folds, when there is much tension on the stump after hysterectomy.
(4) Annular constriction of the rectum by a hæmatocele.
(5) Paresis of the bowel from atony and flatulent distension in a feeble woman after removal of a large ovarian tumour.
(6) Paresis due to peritonitis.
(7) Secondary obstruction—(*a*) due to adhesion of a coil of intestine to a raw surface, such as the cut surface of a pedicle, left at the close of operation; (*b*) due to matting of intestines after peritonitis.

The obstruction due to strangulation from adhesions, or inclusion in a ligature, has all those graver symptoms attending it which we have described as associated with shock. That which follows upon intestinal paralysis is not accompanied by such severe symptoms, though it may occasionally be the forerunner of peritonitis. Some operators, in cases of peritonitis, reopen the abdomen at the point of the original wound by cutting a few sutures, and irrigate the cavity with warm water. This is done by the syphon method and a celluloid catheter, which is introduced, while the bowel is gently moved about. It may have to be repeated a few times, the wound being meanwhile carefully closed with antiseptic dressing.*

At all times swelling of the epigastric region, great restlessness, pallor of countenance, rapidity of pulse, even more than elevation of temperature, must be looked upon as grave signs, and as indications of surgical shock. Such conditions will try to the very utmost the resources of the surgeon. The possibility of internal hæmorrhage, of strangulation, or occlusion of the intestine, the commencement of septic peritonitis, have to be remembered as possible causes of the state we have referred to.

* See p. 463.

Shock.—There is always the danger of shock after the removal of any fibroid tumour, more especially if it have been complicated by the presence of adhesions and great loss of blood, or prolonged anæsthesia. This danger is lessened by attention during the operation to the following points: the avoidance of unnecessary delay by the temporary use of pressure forceps on bleeding-points and adhesions, careful protection of the intestines, and as little injury or handling of the bowel as possible, gentleness in all the intra-abdominal manipulations, and the avoidance of too strong antiseptic solutions. We may suspect the advent of peritonitis by the epigastric swelling, the persistence of pain, the acceleration of the pulse, the continuance of the vomiting, the elevation of temperature,

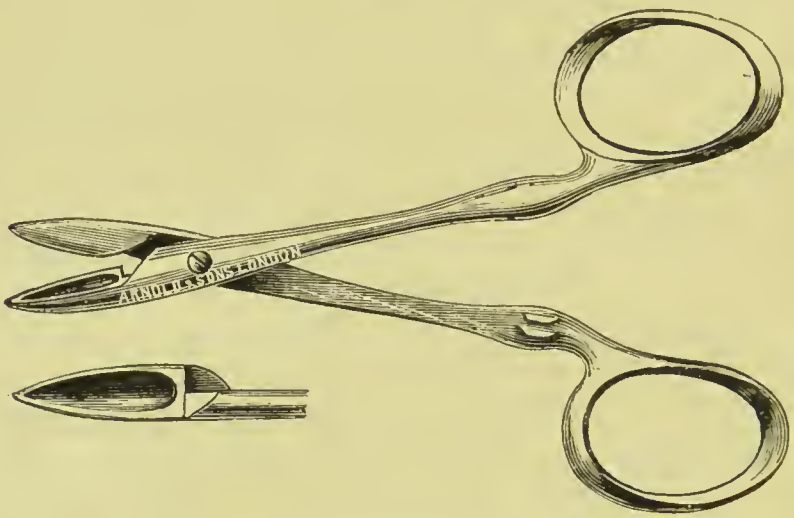


Fig. 346.—Greig Smith's Peritoneum Forceps.

and the general aspect of anxiety and distress on the face of the patient. All such symptoms are intensified as the septic condition becomes more manifest. Death may take place very suddenly from the attendant collapse, which rapidly sets in. The tendency after such operations to embolism, and death from this cause, have to be remembered.

Treatment.—The first step when any such train of symptoms appears is at once to feed by the rectum. A capital rectal injection in emergency is made with a combination of a teaspoonful

of Liebig's peptone-carnis with one teaspoonful of the extract; to this a little brandy may be added. The bowel should be carefully washed out at periodical intervals with an antiseptic solution. Brandy, beef-tea, liquid meat preparations, eggs, milk, or nutrient suppositories, may thus be used. Careful attention has to be paid to the maintenance of the body-heat. Turpentine, administered by enema, or by the mouth when it can be borne, is of the greatest benefit when there is tympanites. (See p. 458 for After-treatment.)

Intestinal Occlusion after Vaginal Hysterectomy.

Gutierrez, at the Geneva Congress, 1896, advised that if, after removal of the forceps, simple enemata cannot produce an action of the bowel, two fingers should be used in the vagina to gently detach any adhesions that may fix the pelvic collarette to the bowel before repeating the administration of any laxative or injections. If, after twenty-four hours, such means fail, he resorts to laparotomy.

Jacobs considers most of such cases of occlusion to be due to septicæmia, but that often such occlusion is due to adhesions set up by the presence of gauze or sponge tampons in the vagina. He also approves of gentle breaking down by the fingers of the adhesions. Régnier holds the same views as Jacobs, believing that patients of the neurotic temperament are disposed to paretic states of the intestines.

Jayle had made over fifty autopsies as the result of cœliotomy. In every case where death ensued within twenty-four hours after date of operation, septic peritonitis, characterized by the presence of microbes, of which streptococcus was the principal, was present. Operative shock and intestinal occlusion had occurred in the majority of instances. Shock undoubtedly predisposed to the occurrence of the occlusion.

(For the method of dealing with ventral hernia after cœliotomy, consult p. 497.)

CHAPTER XXV.

SURGICAL TREATMENT OF UTERINE FIBROMATA (continued).

INTRA-PERITONEAL HYSTERECTOMY AND PAN-HYSTERECTOMY.

The Intra-peritoneal Operation of Schroeder, the Uterine Cavity being opened.—The preliminary steps are the same as in the extra-peritoneal operation. The tumour having been divided about three centimetres from the temporary ligature, the peritoneum is peeled off and retracted so as to leave a margin of serous membrane sufficient to cover the surface of the divided uterine attachment. The bleeding vessels of this surface are tied with gut. When the uterine cavity is opened—which it ought not to be whenever such a contingency can be avoided, for this extension of the ablation adds enormously to the risk of septic infection—Olshausen excavates the bottom of the wound in the form of a funnel. At the same time he removes as much as possible of the mucous membrane. The extreme part of the funnel is then mopped with a 5 per cent. solution of carbolic acid, or the Paqueline cautery is applied. Care is taken not to touch the upper portion of the funnel-shaped depression, as the object is to draw these together and unite them by primary union. To this end gut and silk are used. This is done by passing deep interrupted sutures, which do not include the retracted peritoneal investment, from one side flap to the other, and drawing them together. Then the peritoneum is exactly united over these. Care must be observed not to draw the deep sutures too tightly, lest they

cut the uterine tissue. Pozzi advises in this case the overlying continuous suture. (See p. 429, Fig. 304.) Schroeder combines the use of silk and gut, lest the latter be too quickly absorbed. The silk is passed in the manner shown (see Fig. 347), and through all the thickness of the wound, being carried obliquely and not perpendicularly to the axis of the wound, so as to lie across and not in a line with the vessels. The wound is brought together in a direction parallel to the abdominal incision.

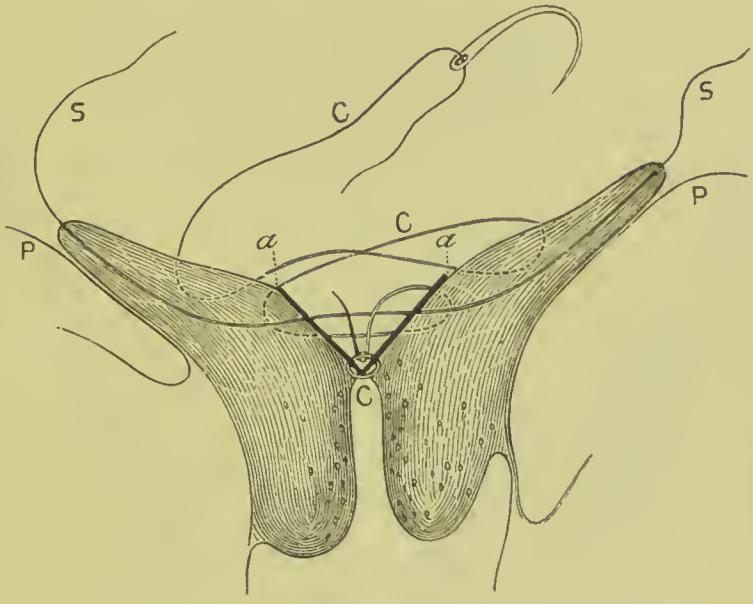


FIG. 347.—Intra-peritoneal Method (Schroeder). *s*, *s*, *s*, *s*, deep suture of silk *ca*, *ca*, continuous superimposed suture; *p*, peritoneum. The lower angle of the wound is marked with a dark line to indicate the part to be treated by carbolic acid or cautery (after Bonnet and Petit).

After the removal of the temporary elastic ligature, if the pedicle still bleed, Martin ties securely each half of it by passing a strong double silk ligature through its midst and dividing this, knotting the two halves. He also uses a vaginal drainage-tube. Depressing well the pouch of Douglas by the finger, carried behind the uterus, he divides the vagina from below upwards, and brings the tube into the vagina by means of a long forceps, surrounding the vaginal end of the tube with an antiseptic packing. He withdraws it on the third or fourth

day. This drainage was not, however, practised by Schroeder, and unless there is special cause to dread septic infection after the operation, it may be dispensed with. Hégar employs, as has been said, an elastic ligature for securing the pedicle.

Fig. 339 shows the temporary elastic cord carried twice round the pedicle and secured by a strong double surgical knot of silk. It may be best for additional security to place a second ligature a little in front of the first. In some rare cases Olshausen and others have used the permanent elastic ligature.

Abdominal Pan-Hysterectomy.—In order to draw the distinction more clearly between the operation thus described and that of total extirpation of the uterus, as practised first by Bardenheuer and Martin on the Continent, by William Smyly and Jessett in Great Britain, by Baldy, Polk, and Boldt in America, I take from Christopher Martin, of Birmingham, who has practised this method on several occasions (and has had up to this date fourteen cases, and one death), the following clear and concise description of the operation. The usual careful antiseptic precautions with regard to the vagina, vulva, and abdominal wall having been taken, and all appliances thoroughly sterilized, the vagina is packed with antiseptic gauze, and an antiseptic compress is applied to the abdomen. When the patient has been anæsthetized, the gauze is withdrawn. The patient is in the ordinary dorsal position.

'The abdomen is opened in the usual way, and the incision is made long enough to permit of the easy delivery of the tumour. When this has been effected, large gauze pads are to be packed into the abdomen above and behind the tumour, to soak up blood, etc., and to prevent undue exposure of the intestines. Sometimes the tumour cannot be delivered through the wound until one or both broad ligaments have been ligatured and partially divided.

'The surgeon should now rapidly note the relation of the tumour to the uterus. He should determine the position of the cervix, and the line of reflexion of the peritoneum from the uterus on to the bladder. He should note the position of the ovarian and uterine arteries, and of the venous sinuses of the broad ligament. In some cases he is able to palpate the ureters in their course from the brim of the pelvis towards the bladder. In this investigation, and throughout the whole of the rest of the operation, a good light is essential, and I have found the electric hand lamp of the greatest value.

'The broad ligaments must now be ligatured in sections and divided

(between *double* ligatures) as far down as the level of the internal os. For this purpose I employ Galabin's pedicle needle—a blunt fully-curved handled needle with two large eyes—and sterilized silk (No. 5). Selecting a spot in the broad ligament free from veins, about the junction of the upper and middle thirds of the ligament, and midway between the uterus and the pelvic wall, a double ligature is passed. Care must be taken that the two ligatures do *not* interlock. By pulling the one forcibly inwards and the other outwards, the aperture of puncture is stretched or torn into a transverse slit, about one inch in length. In some cases I have made this transverse slit by forcing a pair of blunt forceps through the aperture of puncture, and then widely opening them.

FIG. 348.—Passage of the Double Ligature at the Junction of Middle and Upper Third of Broad Ligament.

If this slit be not made, it is difficult to tie the ligatures in such a way that sufficient tissue is left beyond the ligatures to prevent slipping (Fig. 348). The two ligatures are tied as far apart from each other as possible, and the intervening strip of broad ligament severed with a snip of the scissors. Whenever possible, I prefer to remove the ovaries and tubes with the uterus, and hence the outer or proximal ligature should be tied outside the ovary and Fallopian tube. This, however, is not a matter of great importance. In place of the distal ligatures—those on the uterine side—forceps may be applied. I prefer the ligatures, however, as they are not so likely to slip, and they do not by their presence hamper the surgeon. The same manœuvre is to be repeated on the

other side. We have now tied both ovarian arteries, and divided the upper third of both broad ligaments.

'The middle third of the ligament must be similarly treated. A double ligature is passed through the broad ligament about the level of the internal os, and nearer to the uterus than the first ligature. The aperture of puncture is stretched into a transverse slit, the two ligatures tied as far apart as possible, and the intervening bar of tissue divided. The same manœuvre is repeated on the other side.

'The next step is to detach the bladder from the anterior surface of the uterus. The line of reflexion of peritoneum from the uterus to the bladder can usually be seen as a whitish line, above which the peritoneum is firmly attached,

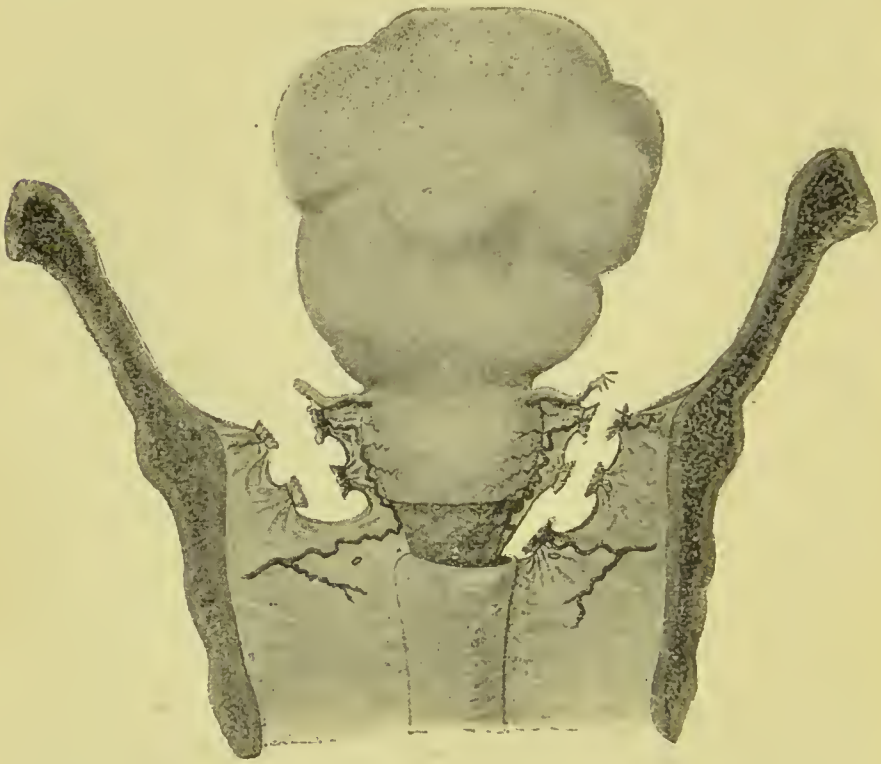


FIG. 349.—Successive Ligatures of Hood Ligament, which at one side is attached by one-third of its length to the Uterus.

and below which it is loosely attached, to the subjacent tissue. In case of doubt a sound should be passed into the bladder, and the limits of the viscus determined. A curved incision is now made about two-thirds of an inch above the line of reflexion across the anterior surface of the uterus from one broad ligament to the other. This incision should not penetrate deeper than the subserous connective tissue. The bladder can now be easily stripped off the uterus as far as the vagina by peeling it downwards with the thumb. The surgeon can tell when he has reached the vagina by introducing a stout pair of

Spencer Wells' forceps into the vagina, and feeling for them with his finger in the gap between the uterus and the bladder. The vagina should now be opened close to the anterior lip of the cervix, by cutting with seissors on to these forceps, and the opening thus made enlarged by tearing. Hooking the fore-finger through this opening into the vagina, and using it as a guide, the posterior fornix is similarly opened with scissors.

'The uterus is now attached on each side solely by the lower third of the broad ligament containing the large uterine artery (see Fig. 349). Should the ureters be seen, they should be carefully pressed outwards. The surgeon must now ligature the uterine artery, and this is one of the most difficult steps of the operation, particularly if the tumour be a large one, more or less filling the pelvis. He must take care, firstly, to pass the needle on the uterine side of the ureter, otherwise this duct would be tied with fatal results; secondly, he must leave enough tissue beyond the grasp of the ligature to prevent it

FIG. 350.—Ligatures cut short and Pedicles dropped.

slipping. With his left forefinger passed into the vagina from behind, he guides the pedicle needle under the uterine artery close above the mucous membrane of the lateral fornix. There is not room to tie a double ligature and to cut between. These ligatures should be tied on both sides before the uterus is cut away from either. The uterus should now be severed from the remaining attachments, keeping as far as possible away from the two lower ligatures. When this has been done, the uterus with its myomatous out-growth is entirely free, and may be lifted out of the pelvis.

'The cut edges of the vaginal wall should be seized with forceps, drawn slightly upwards, and inspected. Should there be any bleeding-points, a few

fine silk sutures should be passed to control the hæmorrhage. I have never had any trouble from this source. The pelvis should be sponged clear of clot, and the pedicles and all raw surfaces carefully inspected with the aid of the electric light, any bleeding-points being seized and ligatured. All the ligatures, except those controlling the uterine arteries, are to be cut short and the pedicles dropped (see Fig. 350). A pair of Spencer Wells' long forceps are passed into the vagina from below, and the two ligatures controlling the uterine artery drawn into the vagina. A thick roll of iodoform gauze must now be drawn down through the vagina by means of the forceps, until only about one inch of the gauze remains in the peritoneal cavity just above the vaginal opening (see Fig. 350). The bladder and divided broad ligaments fall together over the

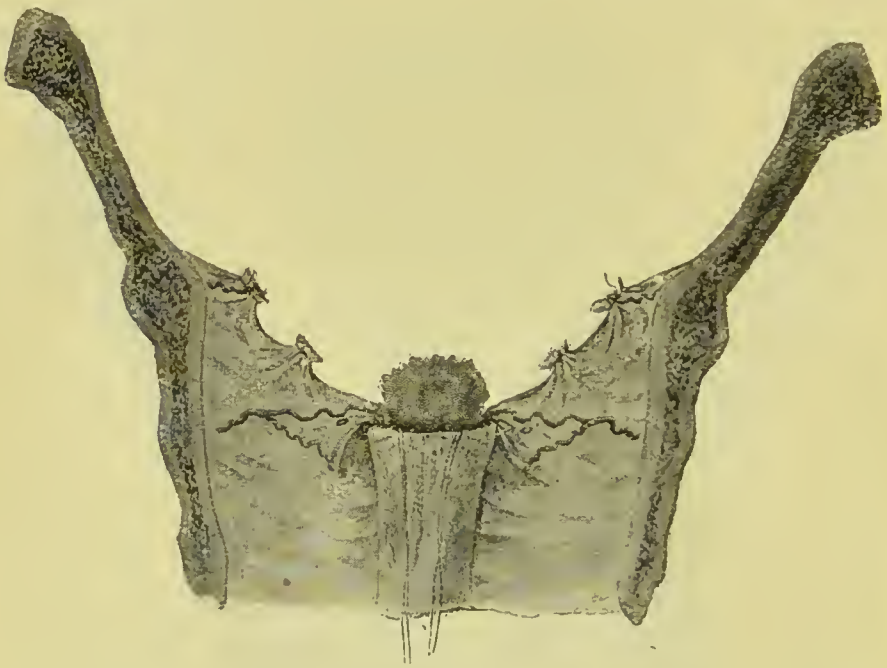


FIG. 351.—Roll of Iodoform Gauze drawn down through Vagina, leaving one inch above the Vaginal opening.

gauze, but I make no attempt to suture the peritoneum over the gauze, or to otherwise close the vaginal canal. The abdominal wound is now closed by interrupted silkworm-gut sutures, no drainage-tube being inserted unless there have been extensive adhesions and there is oozing. The iodoform gauze, which fills the vaginal canal from the peritoneum to the vulva, acts as a drain, and forms an efficient barrier between the peritoneum and infection from below. Its upper end quickly becomes encapsuled with aseptic lymph, so that, when it is removed on the fifth or sixth day, there is left just above the vagina, and opening into it, a granulating cavity shut off from the general peritoneal cavity, and containing on its lateral aspects the stumps of the uterine arteries.

'The after-treatment is similar to that after ovariotomy. For the first four days the catheter is passed every six hours. The iodoform gauze should be

removed on the fifth or sixth day, and after this the vagina should be very gently syringed night and morning with warm weak iodine-water. The stitches in the abdominal wall are removed about the ninth day, and the patient is usually able to get up during the third week, and to go home during the fourth week after the operation. The ligatures on the uterine arteries, which were left hanging into the vagina, are allowed to separate naturally. This they usually do during the second or third week. The patient generally makes as easy and uneventful a recovery as if she had undergone an ordinary uncomplicated ovariotomy. Although the operation is a long and tedious one, it is attended with but little shock, provided the patient be kept warm and the intestine not unduly exposed, handled, or chilled during the operation.'

Martin thus summarizes the dangers of, and the objections to, pan-hysterectomy: (1) It is a long, difficult, and tedious operation, usually taking over an hour; (2) the danger of chilling the patient, unduly exposing the intestines, and so adding to the shock; (3) the danger of one of the ligatures slipping, with consequent internal hæmorrhage; (4) the danger of tearing the bladder and cutting or tying the ureters; (5) the danger of adhesion of bowel to some of the raw surfaces left in the pelvis—a danger I believe to be greatly exaggerated; (6) the danger of infection of the peritoneum through the open vagina; (7) the danger of weakening the pelvic roof by the removal of the cervix, and subsequent collapse (this a purely theoretical objection; it does not occur).

C. Martin, having referred to the dangers arising from extra-peritoneal hysterectomy by means of the clamp, viz., dangers arising from the operation itself, such as a necrosing stump and its consequences, the suppurating chasm it frequently leaves, the tardy nature of the healing process, the tendency to ventral hernia, and the difficulty of getting a safe pedicle, strongly advocates abdominal pan-hysterectomy. 'For my own part,' he says, 'I have vowed never to use a clamp again. . . . Small myomata should be treated by vaginal hysterectomy, and large myomata by abdominal pan-hysterectomy.'

By taking the precautions described, Martin says of the operation of abdominal pan-hysterectomy: '1. It absolutely cures the patient. 2. It has a lower mortality than the clamp operation, than enucleation, and than the intra-peritoneal method of treating the pedicle. 3. It is attended by but little shock. 4. The convalescence is easy and uneventful, the wound heals by first intention, and the patient is up in about three weeks. 5. There is a very slight risk of the subsequent formation of a ventral hernia.'

CHAPTER XXVI.

SURGICAL TREATMENT OF UTERINE FIBROMATA (continued).

(*a*) Other Operative Procedures for the Removal of Uterine Fibroids.

(*b*) Comparison of Relative Risks and Mortality of Various Operations.

The *operation by enucleation* is not in much favour in England, though it has been practised in America and on the Continent. It is more specially adapted for submucous fibroids which protrude rather in the direction of the cavity than towards the peritoneal surface of the uterus, being embedded in the muscular stroma. Schroeder considered that enucleation was justifiable under these circumstances, even when the tumour had attained to the size of the head of the fœtus at full term.

The step of *morcellement* has been added to that of enucleation, to further facilitate the removal of the mass per vaginam. Obviously, the character of the operation must vary according to the size and depth of the tumour. The patient is prepared as for vaginal hysterectomy, and the vagina is packed previously with antiseptic gauze. The dorso-sacral position is chosen, assistance or crutches being necessary to separate the thighs. The uterus is pushed down by an assistant, while another irrigates the vagina thoroughly. It is well opened by retractors. Thus, it is necessary to have at least three assistants during the operation.

The steps of the vaginal operation consist of (*a*) preliminary

dilatation of the uterine neck, or its incision as far as the vaginal attachment, having first ligatured the lower branches of the uterine vessels.

Ligature of the Uterine Arteries.

In operations on the neck of the uterus, where incisions have to be carried deeply through the isthmus, and where the vaginal attachment is encroached on, or when we desire to obtain a better view for manipulation on the uterine cervix, it is right to take the preliminary precaution of ligaturing the uterine arteries. In order to do this efficiently, the patient is placed in the dorsal position, the vaginal opening is well dilated by retractors, and Sims' speculum is used. With a hook the neck is well drawn to one side, so as to thoroughly expose the lateral cul-de-sac; the pulsation of the uterine vessel is then felt for. With a strongly-curved needle armed with a thread of silk, the vaginal cul-de-sac is pierced at a finger's breadth from the margin of the uterus, care being taken to avoid the ureter by not making the puncture at too anterior a level. The tract of the needle takes in the entire thickness of the tissue, being made to reappear posteriorly as near as possible at its point of entrance, and at the same distance from the uterus, thus embracing as little as possible of the vaginal mucous membrane. The ligature having been tied, the same proceeding is adopted at the opposite side. *See Ligation of the Uterine and Ovarian Arteries*, p. 412.

(*b*) The second step consists in the complete depression of the tumour by strong fixing forceps, and the opening of the capsule. This is done with scissors, bistoury, or with the nail of the operator. (*c*) The third step consists in the separation of the tumour with the finger, spatula, or the enucleator of Sims, assisted possibly by the scissors. After this (*d*) the tumour is extracted, as is done in the case of a polypus. The gaping wound is trimmed of any torn portions of mucous membrane which remain, and is thoroughly irrigated with a hot antiseptic solution. Finally, it is tamponed with iodoform gauze, and a subcutaneous injection of ergotine is given to promote uterine contraction.

The dangers of the operation are hæmorrhage, perforation of the uterine wall, possible inversion of the uterus during traction, embolism, thrombosis, peritonitis, and septicæmia. In some cases it is necessary to divide the vaginal wall posteriorly, as well as the uterus, and also occasionally the anterior cul-de-sac. But this applies rather to tumours developed in

the pelvic cellular tissue than to subperitoneal growths of the uterus.

Enucleation by Cœliotomy of Interstitial Myomata. — Sir Spencer Wells was one of the first operators who performed this operation. A. Martin, Spiegelberg, and others, have since largely practised it.

If the operation of enucleation be performed by cœliotomy, a temporary elastic ligature or the rope of Tait is carried round the body of the uterus, below the growth, which is then opened through its capsule. A V-shaped or circular incision is made over the most prominent portion of the tumour, which is then enucleated. The peritoneal flaps are trimmed for accurate adaptation, buried sutures are placed from below upwards, approximating the uterine tissues, and, finally, the peritoneal surfaces are united by interrupted sutures. A. Martin, if the uterine cavity be opened, sutures separately the mucous membrane, using drainage by the vagina or by the method already described. Hégar resorts to abdominal drainage. Under all circumstances, by the tampon and otherwise, the most careful antiseptic precautions have to be taken.

Morcellement.—Emmet practised enucleation and morcellement, but it is Péan's name that is mainly associated with the latter step. I cannot say that it is one which finds many advocates in this country. Even Péan himself has had occasionally to abandon the attempt of thus removing the tumour piece by piece, and finally to resort to total hysterectomy. These, briefly, are the details of the operation :

The patient having been placed in a suitable position, the same steps are taken as in the operation for enucleation. The uterine neck is seized with a strong vulsellum forceps, and drawn down. A circular incision is carried round the vaginal attachment, and the bleeding-points are secured by pressure forceps. The uterine neck is then freed, the peritoneum, bladder, and ureters being carefully avoided. It is next divided by scissors into two halves by lateral incisions reaching to the fibroid tumour, and each half is held aside by

a strong-toothed fixing forceps. The tumour is then as far as possible examined by the finger, the uterus being drawn well

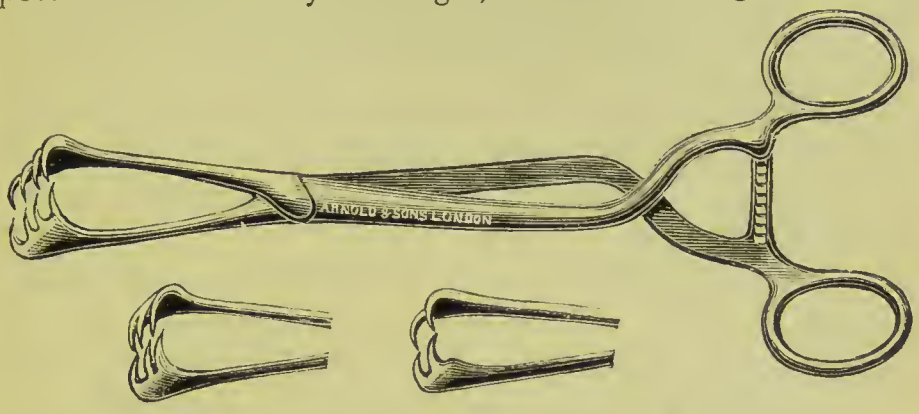


FIG. 352.—Forceps for grasping the Tumour in Morcellement.

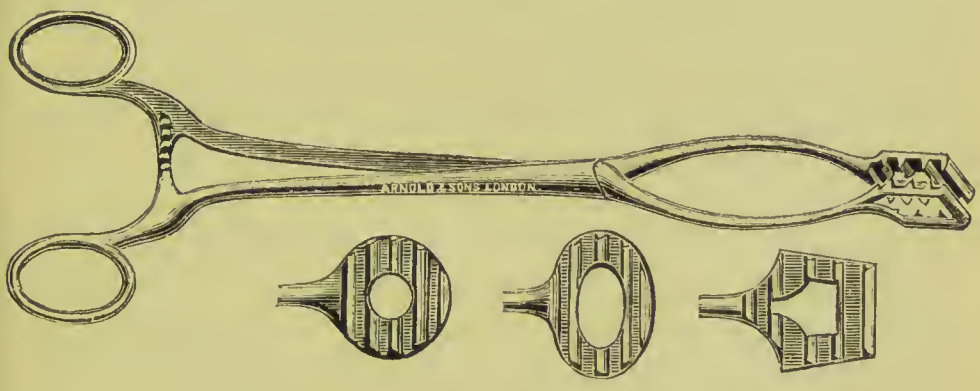


FIG. 353.—Péan's Cyst Forceps, used in Morcellement.

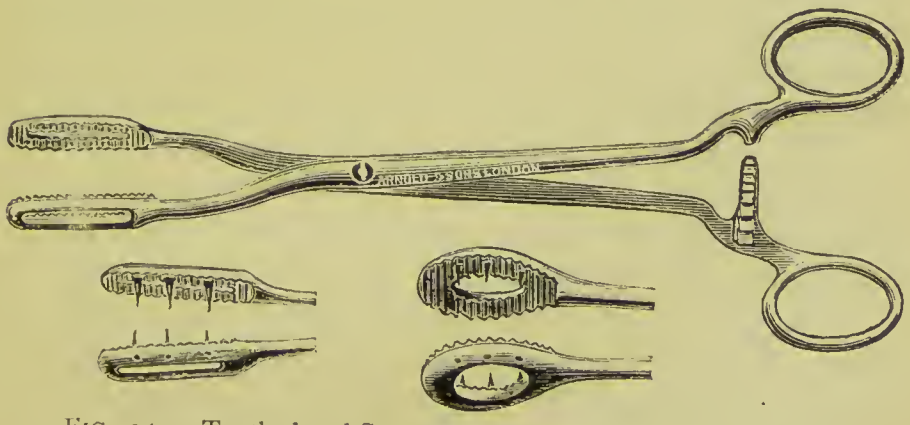


FIG. 354.—Toothed and Serrated Forceps for use in Morcellement.

down for the purpose. The vaginal walls are held widely apart by retractors, and smaller ones are introduced inside the

uterus, and with such forceps as those shown in Figs. 352-354, the tumour is grasped, and a deep longitudinal incision is made into it. Then portion after portion is seized with somewhat similar forceps, and a curved scissors being carried under it, the piece thus caught by it is excised. Two or more forceps are used, and a second portion of the growth is caught before that first seized is removed. The bistoury has a short, broad, and strong blade.

Some tumours bleed more readily than others, the consequence being that the successive removal of each portion is not as easily affected as in the case of bloodless fibroids.

The foregoing steps enable the operator to remove fair-sized tumours from the uterus, but occasionally, when the growths are larger, and the cavity encroaches on the interior of the uterus, or involves more of the peritoneum, rather extensive incisions have to be made. For example, with a view to drawing the uterus towards the vulva, Péan excises the two lips of the neck, suturing these to the vaginal cul-de-sac with silver wire. Should other small myomata be found in the neighbourhood of the larger mass, these and any fibromatous nuclei should be removed by enucleation or morcellement. Hæmostatic forceps are freely availed of in cases where there is much bleeding, the operator having a large number of compressed sponges on holders ready to hand to staunch the blood and enable him to see the bleeding-points. All clots are removed. Forcipressure and sponging are assisted by hot antiseptic irrigation. The forceps are allowed to remain on from thirty-six to forty-eight hours after the operation, tampons of iodoform gauze being packed in between. This termination of the operation refers to cases in which the mass removed is large. Should the tumour be smaller, it is sufficient to suture the lips of the uterine neck, which are thus brought into apposition.

Myomectomy, the Uterine Cavity not being Opened.—This operation, more suitable for a pediculated fibroma, is thus performed. A temporary elastic ligature, or the rope of Tait,

is placed as low as possible on the uterus. When the tumour is raised, the treatment of the pedicle will depend upon its size. If it be small or slight, it may be treated by the Staffordshire knot; but if of a larger size and thick, it is compressed by a powerful clamp-forceps, and the tumour is cut at a sufficient distance so as to peel off the peritoneum and fashion the stump (in the manner already described) which it covers. This is done with silk suture. When all bleeding is stayed by means of forceps or ligature of the separate points, the pedicle is returned into the abdomen. In a case in which the uterine cavity has been opened, the extra-peritoneal method of securing the pedicle must be adopted.

Schroeder combined a continuous suture of catgut with that of silk. The latter is interrupted, and the threads are left loose until the catgut suture has been passed.

The Mixed, or Wölfler-Hacker, Method.—This plan consists in separating the stump of the tumour from the peritoneal cavity by means of sutures, which unite the parietal to the pedicular peritoneum, and fixing it in the interspace directly under the margins of the abdominal incision.

The cut surface of the pedicle is treated according to Schroeder's plan (p. 465). It is then brought beneath the abdominal incision, and a strong suture of silk is carried through the structures of the abdominal wall, penetrating the pedicle and returning on the same side at a short distance from the first puncture. This suture is tied over a roll of iodoform gauze. The drawing (Fig. 355) sufficiently represents the remaining steps of the operation. Sänger, on the other hand, after the face of the stump is covered in the usual method, sutures it posteriorly to the parietal peritoneum, inserting an abdominal drainage-tube.

Fibromata of the Broad Ligaments—Decortication.—These tumours may protrude by a comparatively small pedicle into the peritoneal cavity, or, on the contrary, their base of attachment may be thick, and the greater portion of the tumour remain in the true pelvis. In the former case it may be pos-

sible to apply the temporary elastic ligature. If this should not be so, the annexes on the side corresponding to the tumour have to be drawn well forward, and the broad ligament is divided between two T-shaped clamp-forceps, the greatest care being taken to avoid wounding the bladder, which is often found in close contiguity. A circular incision is made if the tumour be large, or a longitudinal one will be sufficient should it be of a comparatively small size. The

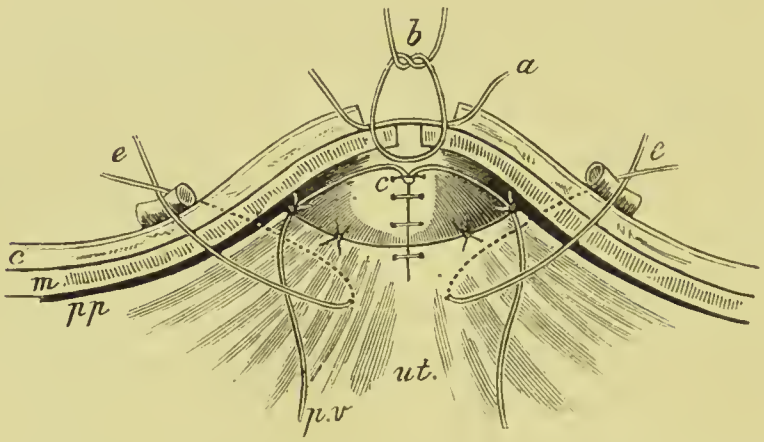


FIG. 355.—Mixed Method of Wölfler and Hacker: *a*, cutaneous suture; *b*, deeper abdominal suture; *c*, peritoneal suture, with catgut; *e*, *e*, buried sutures attaching stump to abdominal wall, tied over rolls of iodoform gauze; *c*, *m*, *pp*, skin, muscle, and peritoneum; *u*, *t*, pedicle (from Pozzi).

margins of the incision having been seized with clamp-forceps, the tumour is drawn forwards by a strong claw-forceps, and its covering peeled off gradually with the fingers, bleeding being controlled in the usual manner during this step. It may be found, from the close attachment of the tumour to the uterus, that hysterectomy may be needful.

Veit's Method for Submucous Myomata.—Incision of the internal vaginal wall as for vaginal hysterectomy. Separation of the bladder from the uterus by the right thumb-nail. Incision of cervix and inferior portion of the body of the uterus. Opening the uterine mucous membrane over the myoma by finger-

nail. Suture of the incisions with catgut ligatures. (Hubert, *Brit. Gyn. Jour.*, August, 1896.)

Veit, in comparing vaginal hysterectomy with cœliotomy, says that the former operation is preferable in the instance of a movable tumour situate towards the pelvis, and in the inferior region of the abdomen. The danger in vaginal hysterectomy lies in the difficulty of securing the vessels. In cœliotomy it arises from septic infection. Hubert draws these conclusions from Veit's operations on submucous myomata :

1. In the case of a small submucous myoma the removal should be effected by an incision in the anterior wall of the cervix uteri, followed by enucleation.

2. When there are two submucous myomata, or only one of larger size, the incision should be made in the posterior wall as well as in the anterior, the volume of tumour should be reduced, and the enucleation completed.

3. A smaller interstitial myoma can also be removed by enucleation without hysterectomy. It is for the second and third class of cases that the method of Veit constitutes a real progress.

4. If a combination of interstitial and submucous myomata be found, it is preferable in most cases to perform hysterectomy.

5. Voluminous interstitial myomata should be treated by the vaginal method, according to the results of a judicious examination.

Such are the principal points, in a general way, of the technique of Veit's operation, which may be varied according to particular considerations of each case.

Doyen's Operation of Total Abdominal Hysterectomy (*Extrait des Archives Provinciales de Chirurgie*, numéro du 1er Decembre, 1892. Second edition, revised and enlarged, 1893).*—The original method of Doyen is thus described by this surgeon. The woman is laid on her back, the operator standing at her right side. The tumour is drawn through the abdominal incision, and turned over on the pubes, which is first covered with sterilized cloths. Every precaution is taken to render aseptic the external genitals and vagina. An incision is carried through the peritoneum from the cul-de-sac of Douglas as far as the most prominent point of the tumour, directly in the middle line. The vagina is opened behind the neck on a forceps introduced through the vulva. An elliptical incision, meeting the upper extremity of the vertical one just completed,

* For Doyen's vaginal hysterectomy, see chapter on 'Cancer of the Uterus.' See also p. 483.

is carried round the uterus at the upper level of the annexa, the concavity being directed upwards, and its highest point reaching above the attachment of the annexa. Viewed laterally, the section of the peritoneum has the shape of the head of a racket. In making the incision in front, the knife is kept well away from the bladder. Fixing the tumour by the aid of the left broad ligament, which is detached and tied, the uterus is rapidly detached by the aid of a scissors or bistoury,

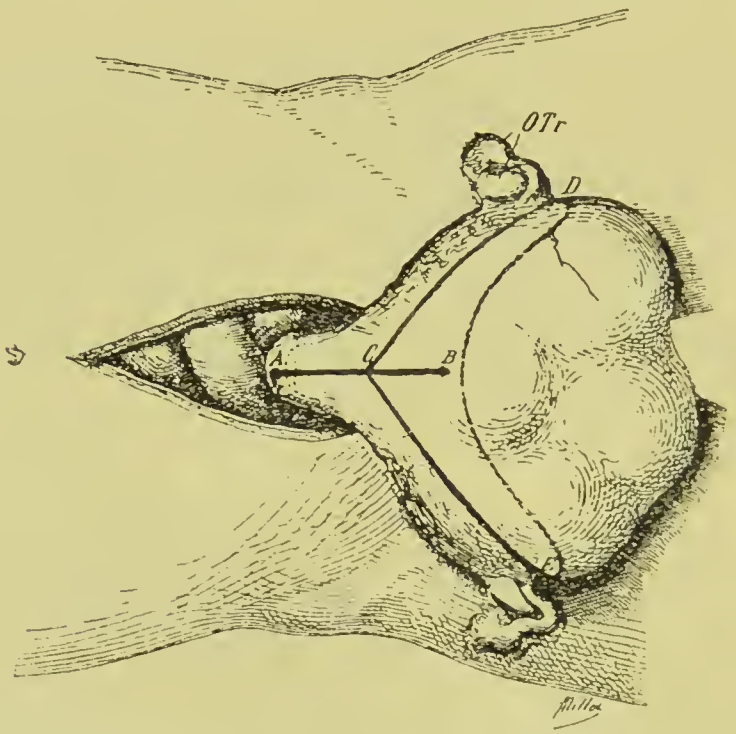


FIG. 356.—Abdominal Hysterectomy (Doyen). Showing incision of vaginal cul-de-sac A, B, and circumferential incision of peritoneum C, D, E. The uterus is turned over on the pubes, showing its posterior surface.

taking care to encroach as little as possible on the uterine tissues. A ligature placed below the annexa ordinarily suffices to arrest hæmorrhages. The peritoneum is now quickly peeled down with the fingers or blunt scissors from the anterior and posterior aspects of the tumour, and the second broad ligament is in its turn detached and tied. Then it is easy to complete the subperitoneal decortication of the entire tumour,

including the neck, and to sever it. Any small arteries in its neighbourhood are tied. The ligatures of the lateral pedicles are carried into the vagina, and thus is formed a large peritoneal collarette. The abdominal wound is for the moment closed by the aid of three or four blunt claw forceps, and the broad ligaments are permanently secured with two or three clamp forceps, which are placed on them through the vulva. The peritoneal toilet is now completed, the vagina is tamponed,

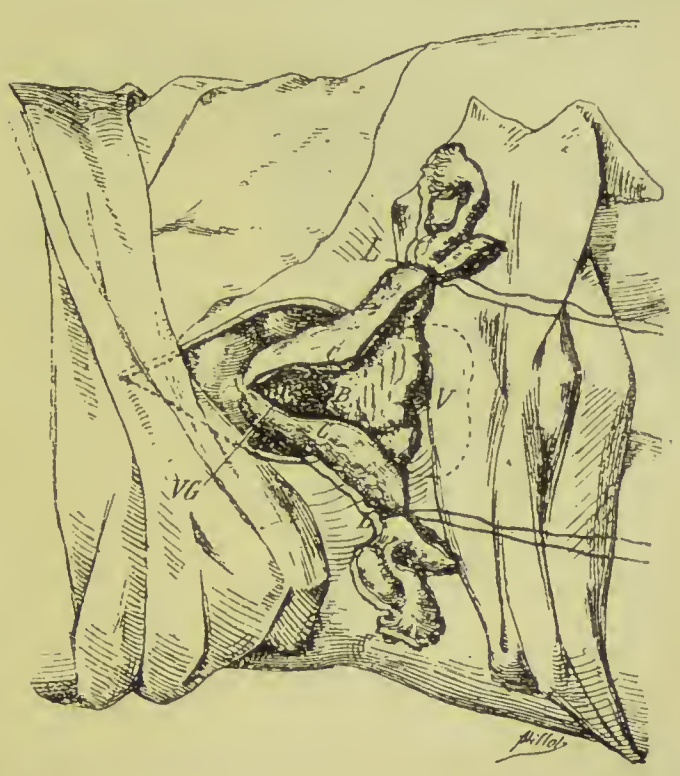


FIG. 357.—Showing the enveloping Peritoneum after removal of the Tumour, and the Ligatures on the Broad Ligaments.

a gauze drain being placed if necessary beneath the tampon, and the pelvic peritoneum closed by a purse-string suture.

It is important to bear in mind the relative position of the annexa to certain tumours. This relation is dependent upon the mode of growth and the original point of development of the tumour. It will also be influenced by the shape and multiple nature of the fibroma. If, for example, the tumour should

distend and fill the uterus, being of the submucous character, it will push the annexa upwards towards the upper zone of the tumour. A sessile subperitoneal tumour, springing from the fundus of the tumour, will have the annexa directly beneath its base, whereas, if it be pediculated, the annexa will be found in their usual position ; a large multiple fibroid springing from the fundus, and depressing the uterine cavity, has the annexa lying underneath its base and attached to it. A tumour developed in the posterior wall, and encroaching on the space of

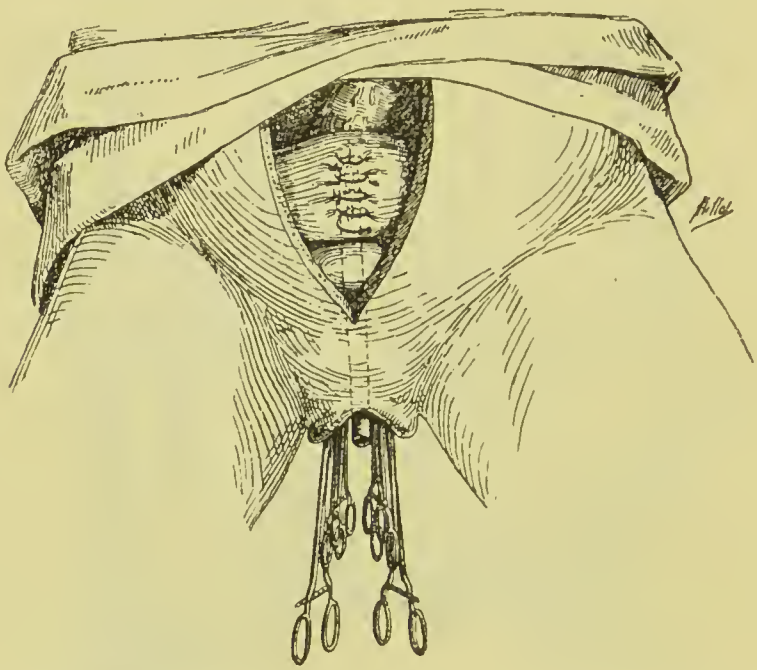


FIG. 358.—Showing Closure of the Pelvic Peritoneum and the Hæmostatic Forceps on the Broad Ligaments protruding from the Vulva (Doyen).

Douglas, will push the ovaries and tubes aside ; the annexa may thus be found either on the summit, or spread out on the side, of the tumour. So if it be developed in the lateral wall or in the broad ligament, the pelvic peritoneum and ovary will cover it. Associated perimetric conditions, such as salpingo-ovaritis, will cause adhesion and attachment of the annexa.

Doyen, in the paper to which we have referred, shows

these several relations of the annexa to various tumours in a series of schemes drawn from the conditions he found present in cases operated upon by him. In some of these the difficulty of securing permanent hæmostasis was necessarily great, if not well-nigh impossible.

Snegireff's Modification of Doyen's Method.

To Edge (in the *British Gynæcological Journal*, August, 1896) I am indebted for a description of Snegireff's modification of Doyen's method. After the incision has been made, and the patient placed in the Trendelenburg position, 'The tumour and the uterus are brought out of the incision. The bowels are covered with sterilized pads, and are pushed up and retained by an assistant. Then two incisions are made on each side of the uterus parallel to the insertions of the broad ligaments, front and back. The lower ends of these incisions in front are joined by a horizontal incision above the bladder boundary, and those behind are joined similarly by an incision 2 cm. above the floor of the pouch of Douglas. The upper ends of the incisions do not quite reach the points of origin of the Fallopian tubes. Then the peritoneal covering of the uterus is stripped off quickly in correspondence with the incisions. Through the slit (in the broad ligament) thus formed, a stout catgut ligature is passed by means of Deschamp's needle and tied beneath the appendages, so as to include all the vascular branches on the front and sides of the uterus. Forceps with long blades are then applied to the uterine ends of the ovarian and round ligament and of the Fallopian tube. Then the broad ligament is cut through and worked off the side of the uterus between the point of ligature and the clamp. This is repeated on the other side.

'The tumour having been thus freed on both sides, the next step is to detach it from the bladder. By drawing the uterus upwards and outwards, one can make out the vesical artery almost to its branches. These are tied by catgut sutures passed with Deschamp's needle and cut through above the ligature. In this way the cervix becomes free in front and at the sides. Then the posterior peritoneum is separated down until the vaginal portion of the cervix is separated from it. Then the posterior wall is cut through with a knife, and the margin of the vaginal mucous membrane is caught up with Kocher's forceps and the cervix is cleared with the knife laterally and in front. The tumour and whole uterus thus are isolated. The vaginal walls and the bleeding vessels are seized in Kocher's forceps and tied with catgut. The uterine appendages are cut off below the points of application of the clamps, the abdominal cavity is cleaned and a pair of long-bladed curved forceps are passed through the vagina, and the long sutures upon the broad ligaments are caught in them; thus the stumps of the broad ligaments are drawn into the vagina. The ligatures are fixed with Péan's forceps and the anterior and posterior peritoneal flaps are sewn together from the peritoneal aspect with continuous catgut suture, by which the vaginal and the depressed broad ligament stump are completely excluded from the peritoneal cavity. A Mikulicz drain is placed in the floor of the pelvis. The patient is put into the horizontal position, and

the abdominal incision closed with deep and superficial silk sutures. The iodoform gauze is carried out through the vagina, and the abdominal wound is covered with a binder.

'On the third day after the operation the patient is given some kind of saline laxative, or castor-oil and enemata are commeneed.

'On the third evening or the fourth morning the iodoform gauze is taken out of the vagina, and douching with sublimate or lysol is done twice a day. In the course of three or four days the iodoform gauze is removed from the peritoneal cavity, and if a sanious discharge is present, which is frequently the case, a rubber drain of medium size is put in until the stitches are removed, *i.e.*, the ninth day. After removal of the stitches and the drainage-tube, the fistulous traek of the latter soon closes up.

'On the tenth day the patient may turn on her side, and sit up on the twelfth, rise and walk on the sixteenth day, in doing which an abdominal belt is absolutely necessary. At the end of three weeks the patients go home.

'The author gives the following as advantages of the method :

'1. No sutures are left in the peritoneal cavity.

'2. No wound surfaee is left above.

'3. If bleeding take place, it will be external and not intra-peritoneal.'

Cœlio-Vaginal Pan-Hysterectomy—Jessett's Method.

Jessett has been one of the foremost advocates in this country for removing the uterus by total extirpation. His special method is founded upon that of Martin, and he claims for it the following advantages over the subperitoneal operation :

(*a*) Free vaginal drainage, and the avoidance of a cavity between the peritoneal flaps and the vaginal roof, into which oozing of blood may occur. It may be well before describing Jessett's modification to briefly follow him in his summary of A. Martin's method :

'The patient having been prepared and the vagina made as thoroughly aseptic as possible, she is placed in the lithotomy position. Martin opens up the roof of the vagina and the peritoneal cavity between the bladder and uterus anteriorly, and Douglas' pouch posteriorly, and ligatures the uterine arteries *per vaginam*. The patient being retained in the same position as before, he opens the abdomen in the middle line, and delivers the tumour through the incision, ligatures the broad ligament on either side down to the vaginal opening, and by dividing the ligaments between the sutures and body of the uterus he removes the entire organ with its myomata. Finally, he laces over the peritoneum with a continuous suture, packs the vagina with iodoform gauze, and closes the abdominal wound.'

Jessett, after the usual antiseptic preparation, adopts Trendelenburg's position, opens the abdomen, ligatures the broad ligaments externally to the

ovaries and tubes, applies clamp forceps between these and the uterus, divides the broad ligaments, reflects anterior and posterior peritoneal flaps from the tumour, at a level of an inch above the bladder, and thus completes the first stage of the operation.

Next an assistant passes a long bivalved obturator (Fig. 363) into the vagina, and pushes it well home. By pressing the proximal ends together, the blades

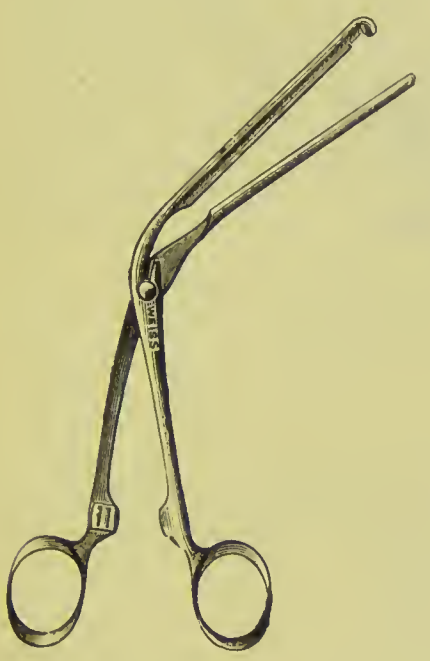


FIG. 359.—Jessett's Broad-Ligament Forceps.

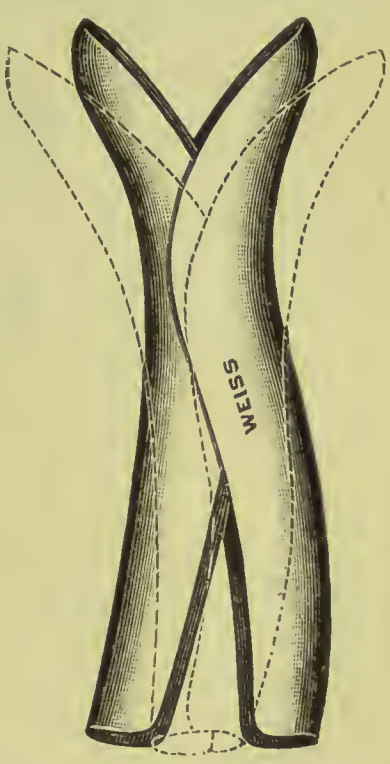


FIG. 360.—Bivalve Vaginal Obturator (Jessett).

in the roof of the vagina separate, and it is put well on the stretch. Incisions are next made on the ends of the blades in front and behind the cervix. A finger is introduced through one of the openings thus made into the vagina, and the

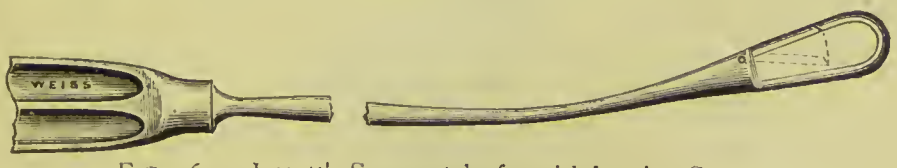


FIG. 361.—Jessett's Snap-catch, for withdrawing Sutures.

tissues are separated laterally. Thus, the ureters are pushed out of the way, and the uterine arteries are ligatured. The parts between the ligatures and the cervix are now divided, and the tumour is delivered.

All bleeding-points are caught and tied. Long sutures are now passed, some four to six in number, by carrying the needle first through the anterior flap from raw surface to peritoneal surface and then over and through the posterior

FIG. 362.—Bivalve Obturator pushed well into the vagina and distending the vaginal roof (Jessett).

FIG. 363.—Snap-catch passed through the Obturator, by which the loops are seized and drawn into the vagina.

flap from peritoneal surface to raw surface. Each suture is tied at the end so as to form a long loop; these are caught in an instrument (Fig. 363) which has a snap-catch at the end, and long enough to pass well through the speculum. The loops are all caught and drawn down through the speculum, and the peritoneal flaps are thus everted into the vagina, which is then plugged with iodoform gauze. If there has been much oozing, a glass drainage-tube may be passed between the peritoneal flaps through the vagina. Finally, the abdominal wound is closed in the usual way.

By adopting this method, a large abdominal hysterectomy is practically converted into a vaginal hysterectomy.

The ligatures around the uterine arteries are left long and conveyed through the vagina; the other ligatures on the broad ligaments are cut short.

After Treatment.—The long loops are removed at the end of thirty-six or forty-eight hours by simply cutting off the knots and drawing them through.

The iodoform gauze is not removed for a week, unless there be a rise of temperature or other reason for so doing. The ligatures securing the uterine arteries usually come away in about ten days or a fortnight.

Indications for Vaginal Pan-Hysterectomy.

Berner lays down the following indications. The operation is limited to tumours that do not exceed in size that of the fœtal head:

'1. When, after failure of all other means, the life or health of the patient is threatened by hæmorrhage, pain, pressure symptoms, or inflammatory and degenerative changes in the tumour.

'2. When, after careful examination under narcosis, the ovaries and tubes are found to be unsuitable for castration, owing to inflammatory adhesions.

'3. When the general condition of the patient is too bad to admit of cœliotomy.

'Under the last heading fall those cases of excessive anæmia and debility in which the opening of the abdomen is very dangerous. There are, furthermore, some cases in which after oöphorectomy the hæmorrhage has persisted, and in which, after total extirpation, the patient has been entirely cured, with fresh strength and a quite satisfactory general condition.

'The difficulty of the operation largely depends on the size of the tumour in relation to the narrowness of the vagina; if the latter be very narrow, even the minor operations of shelling out the tumour, etc., may be as difficult as total removal.

'In many cases, after the broad ligaments have been tied, the size of the tumour can be diminished by incision and enucleation; or the uterus may be removed piecemeal, as may seem best.' (*Brit. Gyn. Jour.*, November, 1895.)

Treatment of Pedicle.

With regard to the two great subdivisions of the operation of hysterectomy—viz., by the intra-peritoneal and the extra-peritoneal methods—Pozzi, who is a confirmed advocate of the

extra-peritoneal operation, thus classifies the indications for the several methods:

(*a*) *For Pedicles in which there is little risk of Bleeding*,

the silk or catgut ligature or suture by the intra-peritoneal method of Schroeder is used. The uterine cavity is not opened.

(*b*) *For Non-bleeding Pedicles*,

when the uterine cavity is opened, if they are sufficiently long, he advises the extra-peritoneal method of Hégar; for shorter ones, the mixed method of Wölfler-Hacker or of Sänger.

(*c*) *In the instance of Bleeding Pedicles*,

if they be sufficiently long, Hégar's method he considers best; for shorter ones, the mixed method of Sänger, with the elastic ligature. If the pedicle be very short, intra-peritoneal elastic ligature (Olshausen) or complete hysterectomy (Bardenheuer).

(*d*) *In the case of Interstitial or Submucous Tumours without a Pedicle*,

interstitial or submucous, which are easily enucleated, and grow from the lateral part of the uterus, he recommends enucleation and suture of the capsule by the intra-peritoneal method of Martin. For similar tumours, when the cavity of the uterus is opened during enucleation, he approves of extra-peritoneal supra-vaginal hysterectomy (Hégar).

(*e*) *Decortication of Tumours without a Pedicle*,

embedded in the cellular tissue of the pelvis, or included in the broad ligament. If small and easily enucleated, he decorticates and completely sutures the bed of the tumour, and does not use drainage. If it be a large tumour, which is easily removed from the abdomen, and which leaves a large bleeding cavity, he decorticates and partially resects it, using superficial sutures. He drains by the vagina (Martin) or by the abdominal wound. If necessary, he tamponades by means of iodoform gauze. For the same type of tumour, attached intimately by vascular connections to the side of the uterus, he resorts to supra-vaginal hysterectomy.

Other indications for abdominal hysterectomy are the tumour's *rapid growth*, the presence of *severe hæmorrhage*, the existence of *ascites*, and the severity of the *pelvic symptoms* caused by compression. Cystic degeneration, suppurative changes, and the possible serious interference with parturition, are also regarded as justification for the operation.

The fibrous tumours which Pozzi considers should be removed by abdominal section are as follows: (*a*) Pediculated; (*b*) with a single nucleus; (*c*) with multiple nuclei; (*d*) intra-ligamentary and pelvic.

There are certain multiple myomatous tumours for which total extirpation can alone be practised.

Salpingo-Oöphorectomy for Fibroid Tumours.

The indications for removal of the uterine appendages and the details of the operation for disease of the annexa will be referred to when dealing with affections of the Fallopian tube and ovary. [See chapter on Affections of the Fallopian Tubes and Ovaries.]

I take this opportunity of objecting to the use of the term 'castration' in describing this step. In the case of fibroid tumours, the organs that are removed may be healthy, for the operation is performed to bring about the premature change of life. Yet even in this instance I think it preferable to adhere to the term 'oöphorectomy,' in which the ovary alone, or 'salpingo-oöphorectomy,' in which both ovary and tube are removed. For in all other cases in which we advise removal of the appendages, we do so for diseased conditions which either directly or indirectly affect the health or threaten the life of the woman. And in the instance of fibroids, the removal of the appendages is undertaken for conditions which would, in the vast majority of those who suffer from them, render conception impossible; also in some 90 per cent. of the cases there are pathological conditions of the appendages associated with these growths. The term 'castration' being associated in the public mind with the deliberate mutilation of the healthy organs of generation for the sole purpose of unsexing the man or animal on whom it is performed, the use of it in describing what is in its ultimate aim and object a truly conservative step for the arrest of pain or hæmorrhage is misleading. Also it can be thus turned to prejudice an operative step, which is, when rightly taken, one of the most valuable of gynæcological procedures, and *does* so tend to bias when the term is thus carelessly or cynically applied.

It is well and interesting to recall Battey's statement to the American Congress of 1881 with regard to oöphorectomy for growing or bleeding fibroids:

'Perhaps no safer rule can be laid down to-day by which one may determine in any given case the propriety of the operation, than by asking himself three questions, namely—1. Is this a grave case? 2. Is it incurable by any of the resources of the art short of the change of life? 3. Is it curable by the change of life? If all three of these questions can be answered affirmatively, the case is a proper one; but if not, the operation is not to be justified.'

Since then, and more especially of late, very different views have been held by leading gynæcologists on the value of oöphorectomy and salpingo-oöphorectomy for bleeding fibroids.

To define the exact character of uterine growth which it is right to treat surgically by removal of the appendages is not possible. This arises from the fact that the two principal indications for the operation, viz., rapidity of growth and hæmorrhage, have associated with them in different women such widely-varying conditions, both touching the tumour itself and the patient's health and circumstances, that no rule applicable to any size of tumour can be laid down. The involvement of other organs than the uterus, the nature of the tumour itself, and the symptoms directly dependent upon it, arising from its size or pressure, the patient's age, the possibility of pregnancy, are among the most prominent facts which must influence our decision. In favour of the operation is the diminution of risk and the large proportion of cures. Against it are the facts that in a given number of cases bleeding continues, and, in a certain proportion, myomata grow more rapidly after the operation. While such an eminent gynæcologist as A. Martin objects to it, other authorities, such as Olshausen, Hofmeir, Fritsch, Leopold, Fehling, Hermes, and Frank advocate it in appropriate cases. And we may say that the same holds good for British and American gynæcologists generally. The difficulties of the operation are not, however, to be minimized, and it may be surmised that the persistence of hæmorrhage in many cases after the operation is due to the fact that at one side it has been found impossible to completely remove the ovary and tube. We may thus epitomize the indications and contra-indications of the operations :

Indications.

(*a*) Small tumours under size of child's head.
(*b*) Rapidly-growing tumours in women under thirty.
(*c*) Small interstitial fibroids.
(*d*) Intra-ligamentary fibroids in the early stages of their growth.
(*e*) When the patient refuses to undergo hysterectomy, but is willing to submit to salpingo-oöphorectomy.

(*f*) Hæmorrhages not yielding to other therapeutic measures, and threatening the general health or life of the patient.

Contra-Indications.

(*a*) Inaccessible ovaries and tubes.
(*b*) Cystic fibroids.
(*c*) Pedunculated growths.
(*d*) Large tumours.

On these indications and contra-indications there is a general concensus of opinion on the part of gynæcologists.

The results of the operation show that in eighty to ninety-five per cent. of the cases the menopause is brought about, and that in at least ninety per cent. of thoroughly completed operations shrinking in varying degrees occurs, while the general health of the patient is improved. It must be borne in mind that in a very large proportion of patients suffering from fibroid of the uterus there are pathological conditions of the ovaries and tubes associated with them.

Comparison of Relative Mortality and Risk of Operation.

It would serve but little useful purpose to enter into the various disputations and statistical records of different operators, whether American, Continental, or British, and the comparative advantages of this or that method of removing uterine fibromata. The divergence of results, as published by the most eminent authorities, arrived at by what they assert to be the same method of operation, invalidates any conclusion which can be drawn from hitherto published statistical records. And this is only what we may expect when we recollect the intrinsic difficulties and differences arising in many of all these operative procedures. Obviously, the exact suitability of this or that method to any individual case must vary according to its nature and local complications. A general survey of the experiences of a large number of operators, and the results of some thousands of cases, shows that the special applicability of

any mode of manipulation must be determined by, and subservient to, the particular necessities of the type of tumour which is at the moment being dealt with. The main aims of all operators, and in every abdominal operation, can be summarized as follows:

(*a*) Reduction of the time of operation to the lowest possible period compatible with its complete performance.

(*b*) Protection of the bowel from injury, and possible subsequent adhesions and consequent obstruction.

(*c*) Complete hæmostasis.

(*d*) The prevention of shock.

(*e*) Avoidance of injury to the bladder and ureters.

(*f*) To secure thorough asepsis.

Whichever operation, to the surgeon's mind, covers most completely these risks, some or all of which are inseparable from the performance of most grave cœliotomies or vaginal hysterectomies, is the one that he should select. And there is the further important consideration that he alone knows the kind of procedure which he has the greatest confidence in his own operative skill to complete, of which he has the largest experience, and which he personally believes will give to that particular patient the largest proportion of chances of satisfactory recovery.

In previous editions of this work I went fully into the question of the statistical evidence as to the relative mortality of extra- and intra-peritoneal operations, and there can be no doubt that previous to the last few years the balance of such testimony was in favour of the extra-peritoneal method. But the work which has been done since 1893 has shown that, as adapted to the special features of the individual case, there is little advantage to be claimed for one method over the other. Such a conclusion is arrived at from the results of the practice of both procedures by such distinguished surgeons as Schroeder, Péan, Hégar, Kaltenbach, Gusserow, A. Martin, Olshausen, Spencer Wells, Lawson Tait, Bantock, Terrier, Pozzi, Terrillon, Howard Kelly, Charles Noble, Mundé,

Zweiffel, Fritsch, Segond, Braun, Bardenheuer, Polk, Boldt, Christopher Martin, Jessett, Kœberlé, Leopold, Mary Dixon Jones, and others in America.

Leith Napier (*Brit. Gyn. Jour.*, May, 1896), after summarizing the returns of various operators, Continental, American, and British, up to May, 1896, impartially sums up the deductions to be drawn from all statistics :

'So far, then, total extirpation may be taken as an equally safe, if not safer, operation than intra-pelvie hysterectomy, in skilful hands. The main question for consideration being, not one of contrast between the extra and intra-pelvic operations (using these words in the ordinary conventional sense), but of contrast between a perfected "extra-peritoneal" and a perfected "total extirpation" operation. . . . We can see little difference between the intra-pelvic operation and total extirpation. . . . The operator who undertakes the intra-pelvie operation has all the difficulties of total extirpation to encounter, with the additional objection that accurate suturing of the cut peritoneal flaps over the intra-pelvie stump frequently occupies even longer time than any other stage of the operation.'

This, he points out, adds to the immediate danger of shock, while, if no suturing be done, the risks of intestinal obstruction and septic peritonitis are increased.

'The risks of chilling the patient, exposing the intestines, and so favouring post-operation intestinal paralysis, and immediate post-operation shock, are clinical experiences we cannot ignore. Injury to the bladder or to the ureter may occur in any of the three methods, but is probably most likely in total extirpation ; then in intra-pelvic hysterectomy the risk of post-operation hæmorrhage is greater than in either of the other two, for in this method considerable bleeding—sufficient to cause a fatal result—may happen rapidly from slipping of a ligature, even without manifest signs of internal hæmorrhage. The bowel may become adherent after total extirpation, but if the peritoneal edges be drawn down as in vaginal hysterectomy, or even kept apart with the gauze with which drainage is secured, this is not very probable. So also the alleged weakening of the pelvic floor is a theoretical objection ; this our experience of vaginal hysterectomy ought to have previously convinced us of.'

He quotes Cushing's statement that in the hands of experts we may expect a mortality as follows :

Extra-peritoneal operation	14·5 per cent.
Total extirpation operation	14·5 ,,
Intra-peritoneal (modern) operation ...	10·5 ,,

But he believes this last figure, although based on 238 cases, is too favourable a one. There is the following important expression :

'The future will show that earlier operations for uterine fibroids should be undertaken than has been our practice in the past. When a fibroid uterus can be removed by the vaginal route, the mortality should be infinitely less than by the abdomen. But this method is only likely to be used when the tumours are not larger than a fœtal head, and the vagina is fairly large, and when there have been no previous peritonitic attacks tending to cause difficult adhesions or complications from tubal or ovarian disease. In suitable cases the mortality of vaginal hysterectomy for fibroid should not be more than from 3 to 5 per cent.'

Noble (*International Medical Magazine*, December, 1893) thus ably refers to the expediency of interference:

'The idea that these tumours are of a harmless nature, or nearly so, that they never cause death, and that they disappear at the menopause, comes grievously short of the truth. It is true that cases of fibroids of the uterus are met with, especially the subperitoneal variety, in which there are few symptoms due to their presence; they cause neither hæmorrhage nor pressure; but such cases are exceptions. In the majority of cases women having fibroid tumours are invalids, either because of the hæmorrhage due to the tumour, or because of pressure symptoms. In many cases, also, fibroid tumours are complicated by diseased uterine appendages, and in such cases the women suffer from the symptoms of both conditions. As my experience increased, I discovered that such patients were not so pleased as I was myself; the large majority of them were great sufferers either from hæmorrhage or from pain, and this continuing for years made life a burden to many of them. It became apparent to me, also, that the teaching concerning the disappearance of fibroid tumours of the womb at the menopause was a mistake. In the first place, the menopause is usually postponed from five to ten years beyond its usual period; in the second place, I have seen numerous cases in which the fibroids grew very rapidly after the menopause; indeed, most of the women upon whom I have been obliged to do hysterectomy had reached or passed the menopause.

'I am not yet ready to accept the proposition that every fibroid tumour should be removed as soon as it is discovered; but I am convinced that this plan of procedure would be much better than the one that has prevailed up to the present time. Granted that the rule is that the subjects of fibroid tumours become invalids for many years, even if they do not lose their lives, it follows that, if they can be safely relieved of their tumours, this is urgently necessary to save them from weary years of suffering. It is difficult to estimate the actual danger to life of fibroid tumours, but it is not inconsiderable. If these tumours can be removed with approximately the same mortality, we have as an argument in favour of such removal the many years of suffering which thus will be prevented. At the present time hysterectomy is done only for the larger fibroids, and for those which are directly threatening the life of the patient; yet in the hands of our best operators, under these conditions, hysterectomy is done with a mortality approaching five per cent. Were the indications for the operation extended and these tumours removed when still small, I believe that this could be done with a mortality of not more than one or two per cent. This being the case, the benefits of operation should be stated to all women having fibroid tumours.'

I cannot but feel that this latter percentage of mortality is, with all our experience, even of the best operators, placed at far too low a level by Noble, and that the mortality resulting from all methods of hysterectomy cannot yet be estimated, speaking generally, at a lower figure than ten per cent.

General Conclusions.

(*a*) The statistics of the most expert living operators, and of the same method of operating, vary considerably in their mortality results.

(*b*) The percentage mortality has decreased relatively with the improved methods of treating the pedicle, drainage, and antiseptic precautions. It has also declined in proportion to the increased skill and experience attained by the operator.

(*c*) The mortality by any method of operation will depend upon the individual conditions and complications met with in the cases operated upon. The difference in the risks between various cases is great, and cannot often be determined before operation. Therefore, in stating such risk to the patient, as should always be done, a margin must be allowed for unforeseen accidents and obstacles. Allowance, too, must be made for extra danger in the case of very large tumours with ascertained adhesions situated deeply in the pelvic cavity, and involving the adjacent viscera.

(*d*) With regard to the relative mortality of the extra- and intra-peritoneal methods, in whatever way the pedicle is dealt with, though the advantage appears to be on the side of the extra-peritoneal operation, more recent statistics and reports appear to have further reduced that advantage, and the question may be said to be *sub judice*.

(*e*) The mortality returns of the most expert operators vary widely, and we may take it that the risk involved in the removal of non-pediculated fibromata ranges from 5 to 15 per cent. in such hands. In certain pediculated cases, where the difficulty is not greater than that involved in an ordinary ovariotomy, the risk is not more than in the latter operation. The truth is,

that each individual case of fibroma has associated with its removal its own particular danger, and it is wrong for any operator, on the ground of any favourable statistical table or successful run of operations, to minimize this danger to his patient. Also, while we take it that the well-performed extra-peritoneal operation has in some hands given more favourable results than the intra-peritoneal procedure, still, the choice of either method will depend upon the special peculiarities of the case under consideration. It may be taken that, including the more unfavourable cases, the mortality of oöphorectomy for fibroma does not exceed 8 per cent., but that its average is from 4 to 6.

The number of surgeons who will be called on to perform, or who will feel justified in attempting, some of these serious operations must always be comparatively small. It must, however, be of importance to the practitioner to recognise those symptoms, on the presence or recurrence of which he will recommend or acquiesce in so serious a step as hysterectomy.

There is no choice save operation when life is seriously threatened either by the large size of the tumour, severe hæmorrhage, great suffering, or suppuration.

There can be little doubt that, with the improved methods of operating, early removal of fibroid tumours will be much more frequently practised in the future than in the past.

I close these observations on the justification for hysterectomy by quoting the words of one whose name will always be revered by British gynæcologists, the late George Keith. They were written as far back as 1883, in a communication to the *British Medical Journal*, when he had just completed twenty-five cases with but two deaths. We may well even now ponder over his closing words: 'After all, the great difficulty is not in doing these things, but in knowing what are the cases in which we are justified in advising those who trust themselves to us to run the risk of a dangerous operation, with all its attendant miseries. Could we get the mortality down to 5 per cent. in the bad cases—and these only are the fit subjects—we might then advise interference with a more easy mind. I am not sure if we can so advise, if the mortality cannot be kept below 10 per cent.' Keith's letter to Mundé (published in the *British Gynæcological Journal*, 1886, vol. ii., p. 439) is another most important declaration of opinion, coming from such a source. 'I never,' he says, 'do any but large tumours, for which there seems no other remedy, and then

usually only when they are not very old. The large tumours seem to have quite disappeared from here. Look at it as you may, hysterectomy is a very risky operation, *and the natural history of mortality of fibrous tumours is practically nil.* I have worked among them for the last thirty years, and that is my experience. Does a mortality,' he asks, 'of 8 per cent. justify an operation for a disease that, as a rule, has only a limited active life—that torments simply, and that only for a time, though of itself it rarely kills? The mortality of an ordinary uterine fibroid, if left alone, is nothing approaching a death-rate of 8 per cent. Most of the cases on which I have operated were known to me for years before ; only the extreme cases were done. In nearly all, the lives were useless, and the risk of operation was clearly understood. Considering the nature of the cases, it seems to me that these operations were, perhaps, justifiable ; and if these were barely justifiable, what can be said of those ghastly lists of hysterectomy where the mortality is one death in every two, one death in every three, or even one death in four or five?'

Mundé also deprecates too heroic treatment of uterine fibroids. He says: 'Subperitoneal tumours seldom call for treatment except for pressure symptoms ; interstitial or submucous for pressure or menorrhagic ; cervical for interference with defæcation, micturition, parturition, coition, or for the bloody discharge to which they may give rise. . . . About one-half of all fibroids require no active treatment of any kind.'

Treatment of Post-operative Hernia.—The personal feeling is, that if an abdominal wound be perfectly closed by separate suturing of the peritoneum and fascia and the entire thickness of the abdominal wall, including the muscle and skin, there is but remote danger of hernia. The risk of such a complication is necessarily increased by drainage. Too tight suturing of the abdominal wound is apt to strangle the tissues, producing suppuration and necrosis of the tissue. In the only case that I myself have met with any serious trouble, which necessitated two operations, the musculo-aponeurotic structures of the abdominal wall were exceptionally thin and weak. Some surgeons, as Doléris, have practised incision preferably through the right rectus muscle, closing the wound by buried sutures. Rapin (Lausanne) modifies a plan of Küstner, and in operations for *hysteropexy*, instead of crucial incision, as performed by the latter, makes a transverse crescentic incision, with the concavity upwards, of from 6 to 10 centimetres in length through the skin and subcutaneous tissue, as far as the aponeurosis. Dissecting that of the linea alba, and fixing the upper cutaneous flap with a temporary suture, he then, in the

middle line, carries a vertical incision of from 4 to 8 centimetres through the aponeurosis, recti muscles, and peritoneum. The wound is finally closed by three layers of sutures, and the skin is accurately brought together so as to ensure as small a cicatrix as possible. The sutures are removed from the third to the eighth day. Contusion of the edges of the wound should be avoided as much as possible.

Condamin (Lyons) employs a method of suturing similar to lacing of a corset (*'en lacet de corset'*). He finds this plan of advantage in the separate closure of portions of the wound according to the need there is for relative tightening of the sutures; he thus better avoids inclusion of the intestine in the wound, and secures more perfect adaptation of the walls of the incision.

In the case I have referred to I resected the cicatrix of the wound by a double elliptical incision, and I then passed four separate sutures through the entire thickness of the abdominal wall. The peritoneum, fascia, muscle, and aponeurosis were separately closed by buried sutures of silkworm-gut. The wound was now brought securely together by the deep sutures which had been entered at a distance of half an inch from either margin. This plan succeeded admirably. Special care has to be taken in these cases to avoid wounding the intestine, which frequently lies in close proximity to the cicatrix.

LEEDS UNIVERSITY

CHAPTER XXVII.

TUBERCULOSIS OF THE UTERUS.

Symptomatology. — As the form of tuberculosis met with most frequently in the uterine cervix or fundus is of the nature of a caseous endometritis, which does not present any clinical features distinctive from those present in other cases of chronic endometritis, there is nothing in its symptomatology sufficiently typical to enable us to distinguish it. This specially applies to those cases in which the evidence of tubercle in other organs is absent, and in which the invasion of the uterus by the miliary type of the disease is but part of the general infection. Suspicion may be aroused by the caseous nature of the discharge, which will necessarily be strengthened by the evidence of tubercle elsewhere. Unfortunately, the Fallopian tubes are frequently involved. We shall refer to tubercular disease of the annexa when dealing with affections of these parts. The time of life in which tubercle of the neck of the uterus is most likely to occur is between the ages of twenty and forty (Zweighhaum).

Bland Sutton states that most examples of tubercular salpingitis are secondary to tuberculosis of the endometrium, and if, as he asserts is the case, tubercular peritonitis in young girls and young women is secondary to the salpingeal affection, the course of the infection is clear; and there can be no question of the great importance of early diagnosis of uterine tubercle. There is but one certain means of diagnosis—viz., the microscopic determination of the bacilli.

In dealing with the value of rectal exploration in the case of female children, as urged by Carpenter, reference has already been made to the existence of tubercle in the young child, and Sehmorl, Lehmann, Birch-Hirschfeld, and others, have shown that congenital tuberculosis may be due to passage of the tubercle bacilli through the placenta to the organs of the fœtus. The bacilli were found in three cases in the fœtal placenta (*Amer. Med. Surg. Bull.*, March 15, 1895).

Pozzi divides tuberculosis of the uterus into these forms: acute miliary, interstitial, ulcerative.

The first, or *acute miliary tubercle*, is simply a sequence of the general infection of the entire system.

FIG. 364.—Tuberculosis of the Cervix (experimental), 57 diam., after Cornil. *a*, villi of the arbor vitæ; *b*, depression between two villi; *c*, tuberenlar granulation.

The interstitial is a rare and essentially chronic form, yet it may manifest itself through uterine accidents and injuries, the results of parturition.

The ulcerative type is the most frequent and the most important. In the early stage the diagnosis is most difficult, and the affection simulates chronic endometritis.

Later, special nodules are developed, and in these the giant cells, with the bacilli, are found. Such a condition as that depicted (Fig. 365) results. There is infiltration of the uterine tissue and caseous degeneration. The cavity of the womb is

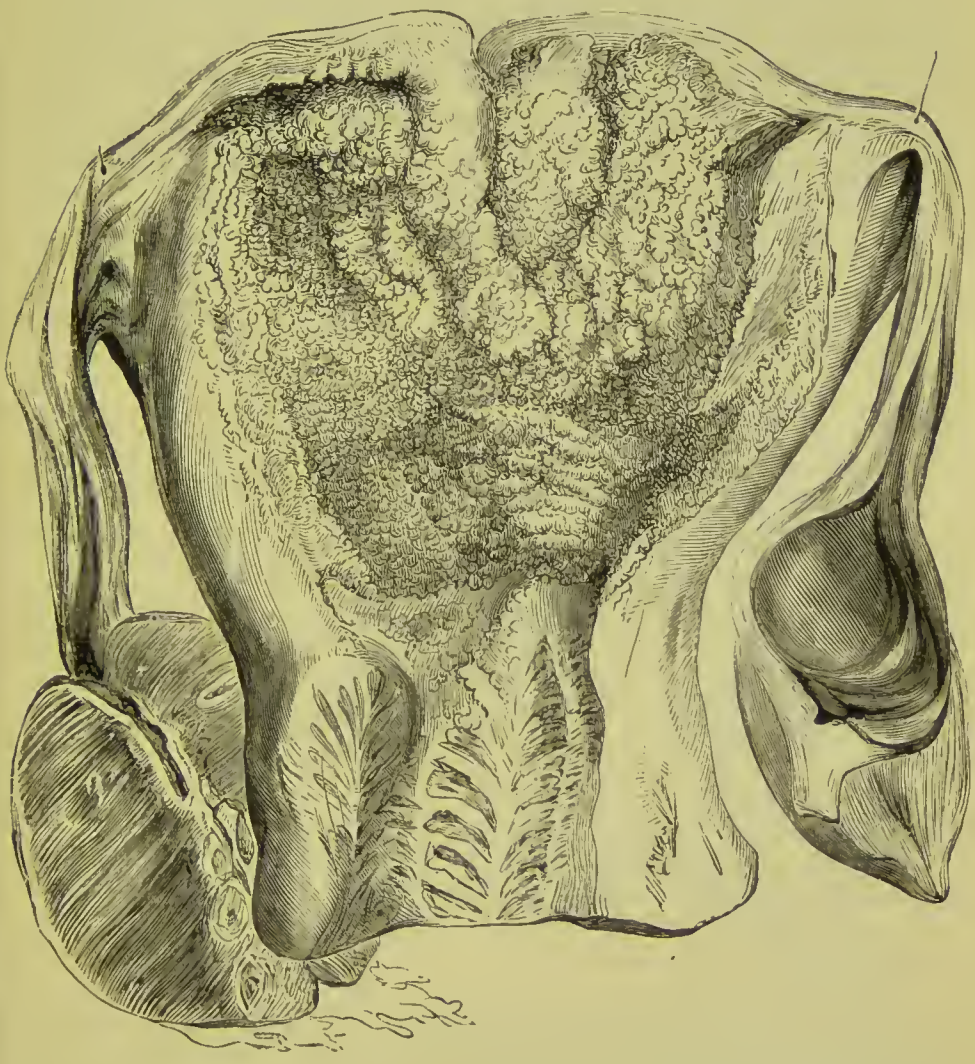


FIG. 365.—Tubercular Disease of the Uterus. The cervix unaffected; the Fallopian tubes were filled with tubercular deposit (Robert Barnes).

filled with this mass of tuberculous granulation tissue, the neck frequently remaining intact. The caseous mass breaks down into pus, giving rise to the characteristic purulent discharge of this variety. Cornil has searched in vain for the tubercle

bacillus in the degenerated débris of the endometrium. Winter, on the other hand, has found the microbe in a case of tubercle of the neck of the uterus.

Tubercle of the body of the womb is frequently attended by endocervicitis, with considerable muco-purulent secretion. Under any circumstances, the bacilli found are few in number. So far as diagnosis is concerned, this is most difficult, though it cannot be doubted that tuberculosis is a more frequent histological cause of inflammatory conditions of the uterus and annexa than is commonly believed.

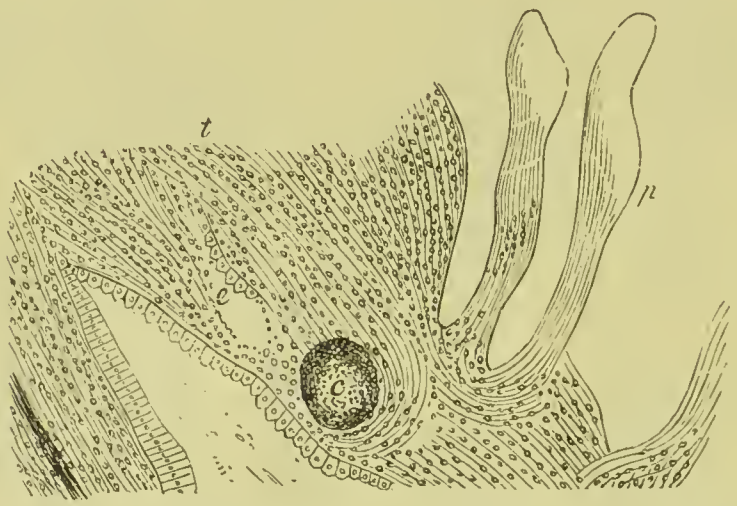


FIG. 366.—Experimental tuberculosis (Cornil). *t*, connective tissue, containing numbers of round cells; *c*, giant cell; *p*, papillæ and superficial vegetations; *e*, fissure in tuberculous tissue with epithelial cells similar to those lining a tuberculous follicle. Adjoining this latter is portion of a gland with its epithelial lining, the cells of which are thickened and aggregated (35 diam.).

Paul Petit considers that among other histological appearances the following are characteristic of tuberculous endometritis:

A diffusion of dying or atrophied interstitial cells; giant cells, in variable numbers; embryonic nodules which are detached from the stroma developed in the vicinity of the vessels, the lumen of which may or may not be preserved; numerous changed glands altered in shape, dilated, and with

the epithelium lining them elongated or in a state of transformation.

In order to complete the diagnosis, it is necessary to remove a small portion of the tissue with the curette for purposes of examination.*

Conveyance of Infection.—Tuberculosis of the cervix may extend to the vagina, and not involve the Fallopian tubes or ovaries. In such limitation of the infection Emanuel considers that the disease has been primarily conveyed during coitus. The finger may convey the disease, so may the sound or other instrument. The important clinical and prophylactic bearing of this latter fact is obvious. Marital intercourse with a consumptive husband is fraught with special danger to the wife. The possibility of his being a cause of direct infection to her can be pressed with emphasis in those sad cases where infatuation and affection, despite remonstrance, still prompts rash determination to marriage, or the husband and wife to occupy the same bed. In cases in which the cervix has been the starting-point of the disease, Emanuel and J. D. Williams have discovered extensive tuberculosis in the lungs and other organs.

* See pp. 326, 340.

CHAPTER XXVIII.

MALIGNANT GROWTHS AND DEGENERATIONS. DECIDUOMA MALIGNUM.

That an affection of the uterus, a description of which has hitherto found no place in any gynæcological text-book, should have recently attracted so much attention, and have caused such frequent discussion, is not a little remarkable. I propose briefly to summarize the pathological and clinical facts connected with a disease which, to those who have investigated its nature, seems to warrant its being placed in a distinct category by itself amongst the malignant affections of the uterus. While prior to the recent discussion at the Obstetrical Society of London (April, 1896), no special attention was drawn to the subject in England, it was well known that in 1889 Sänger distinguished under this title some malignant tumours composed of deciduous or placental elements having special characteristics apart from other uterine neoplasms (*'Zwei aussergewöhnliche Fälle von Abortus'* — *'Ueber Sarcoma uteri deciduo-cellulare'*). And again in 1893 he drew attention to these deciduo-cellular sarcomas, and other decidual tumours of the uterus. Sänger's observations on the malignant character of these degenerations were followed by those of Pfeiffer, Chiari, Müller, Gottschalk, Schmorl, Kaltenbach, and others. In France, Nové-Josserand, Lacroix, Pavio, Jeannel and Beach, recorded cases in 1893, and I am indebted for an able summary of the subject to Maurice Cazin in *La Gynæcologie* (February, 1896).

Maïer, in 1875, published in the *Archives of Virchow* two observations on tumours of the body of the uterus composed of decidual tissue, one of which was afterwards shown by Hégar to have died of a malignant affection considered to be cancer of the uterus.

In 1895 Bacon published a case in the *American Journal of Obstetrics*, and in the same year Whitridge Williams recorded another in which there was rapid vulvar metastasis two weeks after labour. The rapidity of this would appear to have been due to thrombus. Recalling the facts of cases in which certain clinical features answering in every respect to those of malignant deciduoma have occurred to myself, I cannot but think that the want of histological differentiation has been the explanation of the non-recognition of this special malignant type

FIG. 367.—Giant Cells (Maurice Cazin).

of uterine growth and degeneration. Marchand considers that the deciduoma is of an epithelial nature, and several of the French authorities are at issue between the strictly decidual source of the growth and its purely sarcomatous character. Maurice Cazin emphasizes as an important histological and differentiating feature of these cells, that there are no inter-

filamentous or inter-cellular connections present. The presence of a large giant cell, resembling the decidual cell of Friedländer, is characteristic of these deciduous tumours, and they are present in the secondary nodules situated in the surrounding neoplasm, retaining the same type as in the original tumour. This proliferation occurs also in the ovary in the infected cases. In addition to these characteristic giant cells, there is a basis of tissue approaching the sarcomatous form, which invades the other tissues of the organ, into which hæmorrhagic infiltrations occur, and a process of necrosis sets in. Such secondary changes may interfere with the true histological features of the neoplasm. There is no definite arrangement of the cells, neither in size, form, aggregation, nor number, and the appearances are quite distinct from those seen in epitheliomatous growths of a pavement character. With reference, however, to this last point, Marchand regards the growths as distinctly of a carcinomatous nature, having special relation to the development of the ovum. He believes that the tumours are epithelial, having their origin in the syncytium (uterine epithelial layer of the chorion) and the ectodermic epithelium. Hence he looks upon them as tumours of the serotina. The differentiated protoplasmic masses, cells, and trabecular and retiform tissues, are derived from the syncytium. Molar pregnancies, he considers, favour the production of malignant neoplasms, but he does not believe that the decidual cellules, properly so called, participate in their formation. Maurice Cazin well insists that it is important not to speak of a deciduoma, when we are simply dealing with an ordinary sarcoma, through confusion between the cells of the latter and those of the former.

Through the uterine wall there is found an invasion of this neoplastic tissue, and quite apart from the giant cells are small round cells of a sarcomatous type. This bed of tissue is traversed by vessels the coats of which have been destroyed, the lumen limited only by the neoplastic tissue itself. This tissue and cell invasion gradually supplants by substitution the

normal uterine wall. But the giant cells are quite distinct from those large cells seen in ordinary sarcoma. The repartition and distribution of these decidual giant cells is very irregular. The consequence of this degeneration is a superficial zone of necrosis, associated with hæmorrhagic infiltration, due to the vascular condition just referred to.

This affords a histological explanation of the characteristic and intermittent hæmorrhages which are a clinical feature of this affection.

Beneath this necrosed zone, near the cavity of the uterus, there is the denser neoplasm, which irregularly invades the

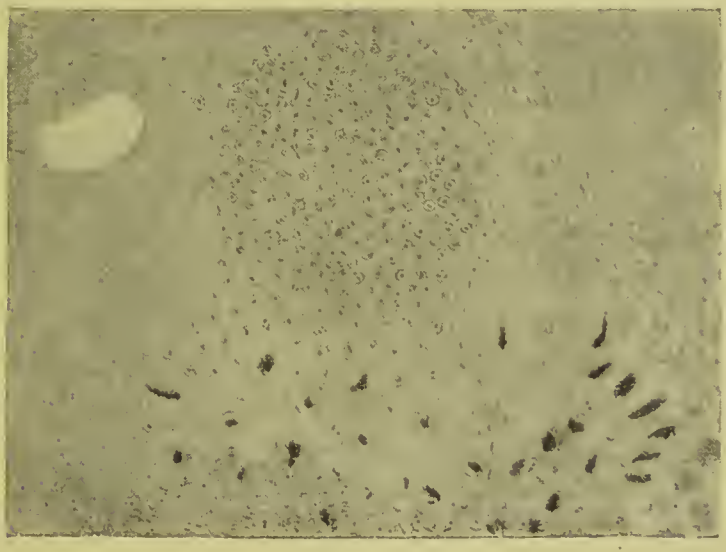


FIG. 368.—Seetion showing grouped Giant Cells and proliferating Groups of Cells of a Sareomatous Type in the Neoplastie Elements. Such grouping has been mistaken for pavement epithelium.

deeper and sounder tissues. And further removed from it, at the periphery of the uterus, there is the external bed of normal uterine tissue, of varying thickness according to the extent to which the disease has progressed. Gottschalk gave the name of *choriodeciduoma malignum* to a variety of the disease in which the affected surface presents a villous appearance, somewhat similar to the villosities of the chorion. Hartmann, Toupet, and others, have reported on these cases. The vege-

tations are vascular, having each a central vessel surrounded by the connective tissue elements. With their rounded expansions in contact one with another, these vegetations form by their connection a neoplastic tissue, which, when they have arrived at their full period of development, has the appearance of a continuous membrane, having a uniform thickness enclosing a limited number of nodules, without any line of demarcation of cellules. Protoplasmic masses are seen forming secondary vegetations, having a larger number of nodules, and provided at their periphery with amorphous granular projections, which are true points of development.

A vascular cavity is found after a time with embryonic elements interposed between the vegetations and the vessel, the coat of which is very thin. The authors referred to regard this neoplastic variety as derived from *the hydatiform mole*, considering it as myxoma of the chorionic villi, rather than as a sarcoma of these structures with an embryonic infiltration, as in the case of deciduoma malignum. It is in these villous forms of deciduoma that the more serious vascular lesions occur, attended by profuse hæmorrhage and venous metastasis. This important histological distinction is thus justified clinically.

Spencer (*Quar. Jour. of Medicine*, July, 1896) quotes the cases of Apfelstedt and Aschoff, as well as of Müller. In the former, secondary growths of hydatidiform mole were found in the labium and paravaginal tissue, and in the case of the latter a row of cystic tumours. Spencer, regarding the whole clinical and histological features of the disease, looks on it as a malignant affection having an association with, or being consequent upon, pregnancy. Hydatiform mole has been observed in 45 per cent. of the cases.

Symptomatology.—The most characteristic symptom is severe intermittent hæmorrhage following upon labour or abortion. The time the bleeding appears after the uterus has been emptied varies. It may occur comparatively soon. In a large proportion of cases, the hæmorrhage, having continued for a time, is attended by the discharge of a hydatid mole. Fœtor of the discharge is frequently present. Metrorrhagia and foul-smelling, dirty-coloured watery losses frequently last after the hæmorrhage ceases, or when the uterine cavity has

been curetted. Associated with these local signs there is a general cachexia, and a falling off in the health of the patient, who gradually becomes anæmic. On making a local examination, the body of the uterus will be found more or less enlarged, movable, or fixed by perimetric adhesions. In the annexa, if affected, secondary nodules project which have a smooth feel. The cervix may be open, admitting the introduction of a finger, but more frequently it is closed. Bimanual examination gives but little information. By means of laminaria the uterine cavity may be explored, and soft vegetating masses, or possibly ordinary coagula, discovered. Cazin says that what appear coagula are often in reality neoplastic masses into which blood has infiltrated. The facility with which the finger of the explorer may pass through the uterine wall and perforate the uterus has to be remembered. But the crucial test must be applied by a histological examination of portions of tissue removed in exploration from the uterine cavity. I have thus briefly, and without bias, placed the views of the Continental authorities I have mentioned on record. And I purposely append to this chapter a bibliographical list of the contributions which have appeared on the subject.

Differential Diagnosis.—When we come to the grounds of a distinctive differential diagnosis of the disease, so far as its clinical features are concerned, we find that, save in the history of the case and its etiology, we have not many reliable data. True, a large proportion of the cases recorded—fully half—suffered when comparatively young; that is, before thirty years of age. Also the character of the hæmorrhage, and its association with labour or an abortion, may rouse our suspicions, while the appearance of a hydatiform mole may confirm these. But the other signs and symptoms, and even the hæmorrhage, are common to carcinoma and sarcoma of the uterus, while both of these diseases may occur in connection with the consequences of conception. At the meeting of the Obstetrical Society of London, opinion was much divided on the subject, when Spencer and Rutherford Morrison both

recorded cases, and Eden combated the view of the decidual origin of the disease. I may express the hope that deciduoma malignum will not become 'the fashion.' It would be better to accept no case as such which is not clearly identified histologically as associated with conception and its products. One good, at least, will result from the recognition of this relationship: it will help to prevent that 'masterly inactivity' so often assumed in the face of grave hæmorrhage and persistent discharge from the uterus after abortion and labour. It will give an increased importance to the occurrence of molar pregnancy, and the presence of hydatids in the uterus. On the whole, this new addition to gynæcological nomenclature must tend to greater accuracy in the differentiation and classification of malignant affections of the uterus.

Treatment.—In view of what has been said of the nature and rapidity of the development and spread of the disease, pan-vaginal hysterectomy, with total ablation of the annexa, is the only course to advise.

BIBLIOGRAPHICAL REFERENCES.

I am indebted to Articles by Walter Swayne (Bristol, Med. Chi. Jour., June, 1896), and Maurice Cazin (*La Gynæcologie*, February, 1896), for these references.

Zahn: Ueber einen Fall von Perforation der Uteruswandung durch einen Placentarpolypen. *Virchow's Archiv.*, Bd. xcvi.

Meyer: *Arch. f. Gyn.*, Bd. xxxiii.

Von Kahlden: Ueber destruirende Placentarpolypen. *Centralbl. Allgem. Path. und Path. Anat.*, Bd. ii., Nos. 1, 2.

Sänger: Zwei aussergewöhnliche Fälle von Abortus. *Centralbl. f. Gyn.*, Bd. xiii., 1889.

Sänger: Ueber Deciduome. *Verhandl. der Deutschen Gesellsch. f. Gyn.*, Bd. iv., p. 333.—Ueber Sarcoma uteri deciduo-cellulare. *Arch. f. Gyn.*, Bd. lxiv.

Löhlein: Sarcoma deciduo-cellulare nach vorausgegangenem Myxoma Chorii. *Centralbl. f. Gyn.*, 1893, p. 297.

Köttnitz: Ueber chorio-deciduale Tumoren malignem Charakters. *Deut. Med. Woch.*, 1893, p. 497.

Nové-Josserand et Jacroix: *Ann. de Gyn. et d'Obst.*, 1894, t. xvi.

Paviot: *Ann. de Gyn. et d'Obst.*, 1894, t. xli., p. 306.

Jeannel, Congrès Français de Chirurgie, 1894.

Hartmann et Toupet: *C. R. de la Soc. Anat. de Paris*, Octobre, 1894.—*Ann. de Gyn. et d'Obst.*, 1894.

Klein : *Archiv. f. Gyn.*, 1894, Bd. xlii., p. 243.

Bacon : A Case of Deciduoma Malignum. *American Journal of Obstetrics and Diseases of Women and Children*, 1895.

Whitridge Williams : *Arch. f. Gynaek.*, 1888, xxxiii. 53.—*Am. Gyn. and Obs. Jour.*, June, 1895 ; *Am. Jour. Obst.*, xxix. 721.

Marchand : *Monatssch. f. Geburtsh. u. Gyn.*, 1895, Bd. i.

Kossman : Das Carcinoma syncytiale uteri. *Monatssch. f. Geburtsh. und Gyn.*, Bd. ii., H. 2.—Discussion in *Zeitsch. f. Geburtsh. und Gyn.*, Bd. xxxiii., H. 2.

Carl Ruge: Ueber das *Deciduoma malignum* in der Gynäkologie (*Verhandl. der Gesellsch. f. Geburtsh. u. Gyn*). *Zeitsch. f. Geburtsh. und Gyn.*, 1895, xxxiii., Heft 1, p. 152.

Pestalozza : *Arch. f. Gynaek.*, 1890, xxxvii. 251, and 1894, xlvi. 1.—*Berl. Klin. Woch.*, 1893, xxx.

Pfeiffer : *Prag. Med. Woch.*, 1890, xv. 327.

Fränkel : *Arch. f. Gynaek.*, 1895, xlviii. 80.

Bacon : *Am. Jour. Obst.*, 1895, xxxi. 679.

Menge : *Zeitsch. f. Geburtsh. u. Gyn.*, 1894, xxx. 323.

Löhlein : *Centralbl. f. Gyn.*, 1893, xvii. 297.

Klien : *Arch. f. Gyn.*, 1894, xlvii. 243, 705.

Nové-Josserand and Lacroix, *Ann. de Gyn. et d'Obst.*, 1894, xli. 109, 216, 317.

Tannen : *Arch. f. Gynaek.*, 1895, xlix. 94.

Eden : *Tr. Obst. Soc. Lond.*, 1896, xxxvii. 205.

Geburtsh. u. Gyn., 1896, i. ; abstract in *Med. Chron.*, 1896, N.S., iv. 210.

Kuppenheim : *Centralbl. f. Gyn.*, 1895, xix. 916.

Schmorl : *Die Allgemeine Pathologie*, 1889, ii. 612.—*Centralbl. f. Gyn.*, 1893, xvii. 169.

Pathologisch-anatomische Untersuchungen ueber Puerperal-Eklampsie, 1893.

Rutherford Morrison : *Brit. Med. Jour.*, 1896, i. 976.

Spencer : *Brit. Med. Jour.*, 1896, i. 976.

Spencer : *Quart. Jour. Med.*, July, 1896.

CHAPTER XXIX.

MALIGNANT GROWTHS AND DEGENERATIONS.

CANCER OF THE UTERUS.

Etiology.—Cancer of the uterus may occur in the body or cervix. We may subdivide the three leading types of malignant disease of the uterus into *medullary*, *epithelioma*, and *scirrhus*.

Pozzi divides cancer of the neck by its anatomical characteristics into the *papillary, nodular, excavated, and the vaginal forms.*

Certain varieties of malignant disease of the uterine neck have been recorded. Thus, Spiedelberg has described a case in which the sarcomatous degeneration assumed the papillary form, filling the vagina like a hydatiform mole. Ludwig Pernice has recorded a myo-sarcoma of the neck resembling a bunch of grapes, and Gaillard Thomas a fibro-adenoma of the same character; while other papillary outgrowths of a cartilaginous, myxomatous and adeno-myxomatous nature, have been recorded by Mundé, Thiede, and Winckel.

I lately removed a small mass from the cervix uteri which had been under my observation for some time. It bled profusely when slightly punctured. Then the patient consulted me for a hyperplastic uterus and metrorrhagia at the menopause. Its colour was a bright red. Fearing further degenerative changes, I dissected it out. The tissue removed was distinctly papillomatous, a view in which Bland Sutton, who examined it microscopically, concurred.

Malignant Adenoma of Cervical Glands.—Alfred Smith has reported a case of malignant adenoma of the cervical glands. The uterus was removed by vaginal hysterectomy. The recovery was uninterrupted. 'Malignant adenoma of cervical glands is, according to C. Gebherd,* extremely rare; he can only find a record of six cases. Ruge and Veit† say that cases of adenoma in the pure form are seldom met with, and Bröse‡ agrees with them also in the extreme rarity of this affection. The specimen microscopically showed the upper portion of the cervical canal greatly distended and excavated. The lower portion was apparently normal. The microscopic section showed a columnar cell epithelioma.'—Taken from the *Medical Press and Circular*.

---

* *Zeitsch. f. Geburtsh. u. Gyn.*, Bd. xxxiii., Heft 3, 1895.
† *Idem.*, 170. ‡ *Idem.*, 134.

The most distinguished pathologists have been divided in opinion as to whether cancer be primarily a local disease—one of the peculiar characteristics of which is to rapidly invade the system through the blood and lymphatics—or if it be but the local manifestation of a constitutional or general blood state. The weight of evidence, both clinical and pathological, appears to me to be on the side of those who hold the former opinion. It is common to find cancer in persons of a robust constitution in other respects. We must, however, admit that there is much to be said for both these views. It is certain that in many persons there is a constitutional vice present long before the malignant tendency manifests itself, and the hereditary nature of the disease in some few cases would seem to corroborate this opinion. There are peculiarities connected with the malignant tendency in some organs, as in the breast, the penis, the lip, and the scrotum, which appear strongly to favour its local origin. On this interesting question, however, we cannot enter here. Scheurlen's statement that he has discovered a morphologically distinct cancer bacillus has not been substantiated by subsequent observers, Senger and Virchow proving that this bacillus grew on potato sections without cancerous origin; nor were Balance and Shattock, in their experiments with cultivations of the microbe, able to propagate the disease by inoculation.

Age.—The tendency to cancer of the uterus increases after thirty years of age, the largest proportion of cases occurring during the menopause, from forty to fifty, and in married women—excessive sexual intercourse acting, it is believed, as an exciting cause. Yet, as Schroeder remarks, 'prostitutes have no special tendency to cancer of the uterus.' Nor does it seem that the popular belief in the hereditary character of the disease has much foundation in fact. These statistics, cited by Schroeder, are of interest:

Of 1,237 women attacked with cancer, 753 were from 40 to 60 years of age;
Of 1,000 Vienna women attacked, 771 were married or widows;
Of 948 women affected, in 78 only was it hereditary.

Eckhardt has noted a case of carcinoma in the cervix of a virgin of 19; Bicget, at 19; Glatter, at 17; Schanta, at 16; Mundé, at 23; and Rosenlein, at 2 years.

These are some of the earliest occurring instances of carcinoma on record ('Annual Universal Medical Sciences,' 1888).

The concensus of opinion is in favour of the predisposing influence of labour and laceration in causing malignant disease of the cervix.

Coe states that over one-fifth of the recorded cases of cancer occur in patients under forty years of age.

It would appear from the statistics of Simpson, Kiwisch, and others, that in one-third to two-thirds of all cases of cancer, the uterus is the organ affected.

Of encephaloid, epithelioma, and scirrhus, the last-named variety is comparatively rare — I have only seen two well-marked, and one uncertain, case of *true* scirrhus of the womb.

Mary Dixon Jones quotes a case of cancer of the pelvic floor in which she found scirrhus, adenoid, and medullary cancer in the same specimen.

Origin of Cancer in Connective Tissue and Lymphatics.

In this particular case there was a tumour in the pelvic floor attached to the left ovary and tube. The right appendages were also diseased. The entire pathological condition was consequent upon old-standing perimetric trouble. Commenting on the source of this cancerous development, Mary Dixon Jones remarks that there is no normal epithelial structure present, as stated by Waldeyer and Thiersch to be necessary for the development of cancer. Commenting on the presence of columnar epithelium in the gland-like formations seen in these sections, she says: 'The "adenoid variety" is conspicuous by epithelial nests hollowed out in their centre into more or less regular cavities typical of glandular tissue (Fig. 369). The epithelia become columnar, being attached at the apices by narrow feet to the surrounding layer of connective tissue. Thus are produced convoluted tubular formations of the subjacent connective tissue and lining epithelium. Still further magnified globular and irregular secondary formations are found in the epithelia, supposed by some to be parasitic.' These formations are consequent upon active proliferation of the epithelia (Virchow), and tend to new formations. In the infiltration of the connective tissue with granules and globules, and this 'inflammatory proliferation' adjacent to the cancer nests, she sees the gradual reduction of the new growth to its embryonal or medullary condition (Fig. 370). Inflammatory corpuscles shape themselves into cancer epithelia, and the medullary corpuscles form cancer nests. In fact (Heitzmann), the 'small cellular infiltration' (Fig. 371) is the 'fore-

stage of cancer.' Such infiltration is a sure means of prognosis of return of cancer in the spot.

'It is the chief zone of local recurrences after extirpation.' No longer can the presence of cells be regarded as essential to proliferation, and we must seek in the fibrous basis substance for the transformation into protoplasm. In it are generated the cancer epithelia. Further microscopical investigation in this case showed the following points of pathological interest: (1) Rows of cancer cells in the lymph vessels, dilated by and carrying these; (2) thrombosis by the cancer epithelia of the true lymph vessels (Fig. 372); (3) secondary changes in the vicinity of the invaded lymphatics; (4) degenerating changes in the lymph vessels, walls, and adjacent connective tissue. Thus, the spreading of the cancer by the lymph vessels is established.

She says elsewhere: 'Under a power of twelve hundred diameters I have seen some of the marvellous changes taking place in the cancer nuclei.' They become coarsely granular, undergo division into smaller pieces of protoplasm, or, as some say, there is a "wild evolution of cells." Thus, the nuclei break up into a number of irregular lumps of living matter, each one becoming an active centre of infection. They invade the lining endothelia of the lymph vessels. These endothelia become enlarged, filled with granular matter, and also undergo karyokinetic division. Changes take place in the wall of the lymph vessels, they melt away, and the cancer passes into new fields, taking possession of new and larger territories, still growing and spreading. Under the microscope the tissues around the lymph vessel were found filled with cancer epithelia; even the fibrous connective tissue surrounding the thrombus was in a state of active proliferation.' The part played in the etiology of cancer by the parasitic coccidia is still a matter of dispute, some, as Dumaire, denying their parasitic nature and ascribing the presence of the pseudo-coccidia to transitional changes in the epithelial tissues. A doubt is thus thrown on the pathological researches of Wickham and others, who attribute to psoro-sperms the epidermal growths in certain forms of carcinoma.

FIG. 369.—Thrombosis of Lymph Vessel of Left Ovary with Cancer Epithelia (× 600). *O*, Fibrous connective tissue of medulla of ovary near hilum; *n*, bundles of smooth muscle fibres; *m*, lymph vessel with unchanged endothelial lining; *L*, cancer epithelia filling and extending the calibre of lymph vessel; *L'*, cancer epithelia whose nuclei show karyokinetic figures.

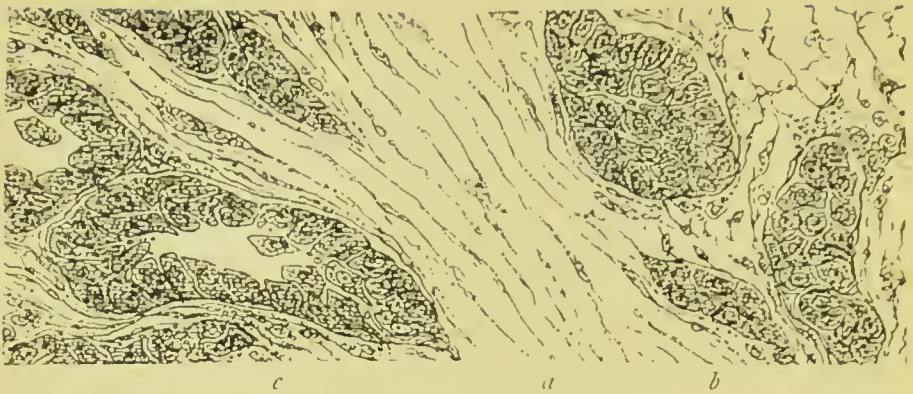


FIG. 370.—Scirrhous and Adenoid Portion (× 200). *a*, Longitudinal bundles of coarse fibrous connective tissue; *b*, small nests of cancer epithelia, the scirrhous portion; *c*, gland-like formations of cancer epithelia, the adenoid portion.

FIG. 371.—Adenoid and Medullary Portion (× 200). *A*, medullary portion of cancer; *B*, Adenoid or gland-like formations of cancer epithelia; *C*, so-called small cellular or inflammatory infiltration of fibrous connective tissue; *D*, longitudinal bundles of coarse fibrous connective tissue with formations of nests between the bundles.

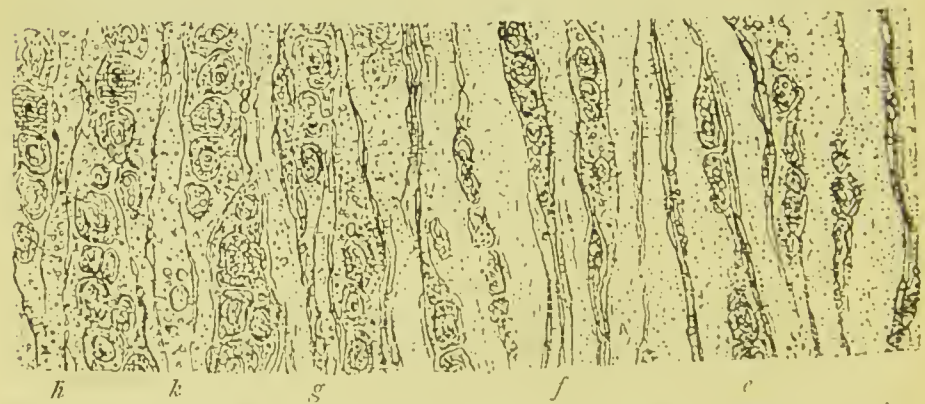


FIG. 372.—So-called Small Cellular or Inflammatory Infiltration of Fibrous Connective Tissue near Cancer (× 600). *g*, Interstices between the bundles, enlarged, holding lumps of living matter; *h*, basis substance of bundles unchanged; *k*, transformation of basis substance into protoplasm; *f*, globular bodies sprung both from the interstitial protoplasm and the bundles; *e*, angular cancer epithelia, the products of globular bodies.

Roger Williams (Preston) estimated that 8,000 women in England and Wales were suffering from cancer in February, 1896. In a paper written by him on the morphology of cancer,* the following are some selected points of practical importance:

1. In no single instance had the disease originated from the peritoneal lining of the uterus.

2. Of 4,628 consecutive cases of primary cancer in females, 1,571 were uterine, forty were vaginal, and none originated in the Fallopian tubes.

3. Schroeder's revised estimate of the proportion of cervical cancer to that of the body is one in forty. Blau, Hoffmeir, and Pichot estimated it at one in sixteen, the reverse of what occurs in myomata.

4. Some 90 per cent. of the cases examined are of the cylinder-cell variety of cancer.

5. In both the cylinder-celled and squamosal varieties the initial lesion is generally a small solitary nodule, not a diffuse infiltration.

6. The proneness to bleeding in cancerous ulceration is due to the covering of the exposed cancerous surface with fine capillaries, readily ruptured.

7. In cancers of the cervix constituent cells undergoing mucoid or calciform changes, similar to those so characteristic of the cells of the cervical glands, have been observed (Cornil).

8. Uterine cancer cells are prone to fatty, caseous, mucoid, and other degenerative changes. Colloid and pigmentary metamorphoses are very rare.

9. Though the parasitic protozoa of Müller are present where the cancerous growth is most active, as in the form of rounded, hyaline, spore-like bodies, they are not to be regarded as specific cancer microbes; nor are the blastomycetes occasionally found to be regarded as specific cancer microbes.

10. In the cervix the tendency of the disease is to spread downwards, forwards, and outwards towards the anterior vaginal

* *British Gynæcological Journal*, February, 1896.

wall and the base of the bladder, while in the body the direction is towards the peritoneum, progress being much slower than in the cervix. Statistics show that the tendency of cancer of the uterus is almost invariably to disseminate locally, and hence the frequency of rapid recurrence after ablation. *Cervical cancer may also spread upwards and invade the corpus; this need excite no surprise when we recollect the freedom of the anastomoses between the lymphatics of the two segments of the uterus, and the facility with which retrograde lymph-currents are set up.* Also, cancerous foci have been found in the body in cases of primary cancer of the cervix with no structural alteration of the intervening parts.

11. Of seventy-eight patients who died of uterine cancer, Roger Williams found the kidneys diseased in every case, the vagina in seventy-two, and the bladder in fifty-six. The rectum was infiltrated in nineteen, and the pelvic contents were matted together in thirty-four cases. The ovaries were invaded in thirteen, the broad ligaments in five, and the Fallopian tubes were diseased in ten cases.

12. There is a great contrast between the lymph-gland dissemination in the case of the uterus, and of the mammary gland, it being much less frequent in the former than the latter. The ilio-pelvic group of glands are those most frequently invaded—fifty-six in Williams' cases. Next in frequency come the pelvic glands, and in exceptional instances the lumbar glands. In a small proportion the inguinal glands and mesenteric ganglia were invaded. The occasional involvement of the supra-clavicular glands, due probably to regurgitation of lymph charged with cancer cells from the thoracic duct into the adjacent cervical glands, is usually a late symptom, and in itself a contra-indication to operation. Rarity of dissemination in the adjacent lymph glands as detected by operation is the rule, and glandular recurrence is rare.

Lastly, it may be taken as a general rule 'that the uterus is one of those organs in which the liability of cancer to dis-

seminate in distant parts of the body is not very great.' Roge Williams has met with it in 20 per cent. of patients suffering from cancer of the uterus, as compared with 73 per cent. attacked with cancer of the breast.

Varieties.—Medullary Cancer.—Dependent upon the relative proportion of connective-tissue elements and epithelial cells

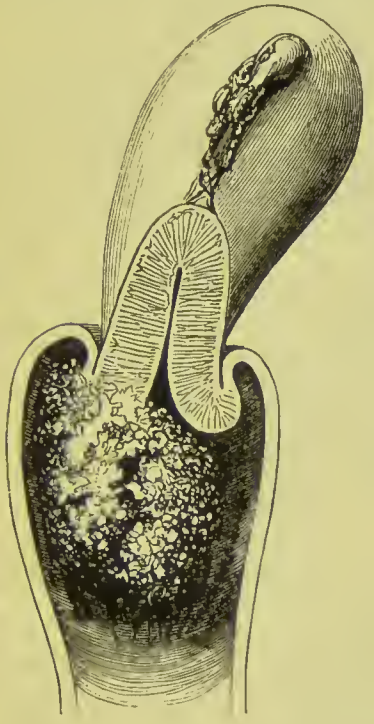


FIG. 373.—Cauliflower excrescence growing from Cervix Uteri (after Sir J. Simpson).

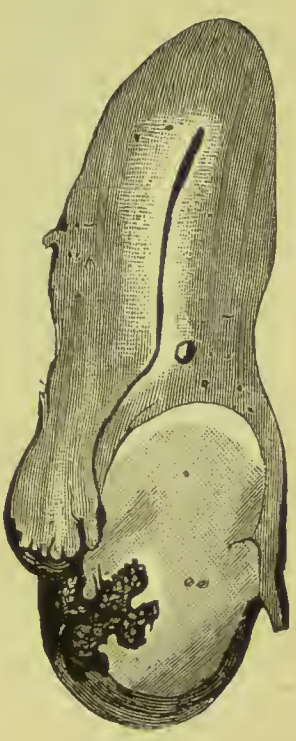


FIG. 374.—Cancerous growth in Posterior Wall of Cervix, ulcerating (J. Williams).

contained in its trabecular framework, we describe the cancer as hard or soft. In the medullary cancer there is a preponderance of the epithelial masses of cells, which form plugs in the uterine tissue, under the mucous membrane, invading the areolar elements. This invasion proceeds, both in an outward direction and inwards towards the cavity of the uterus. The areolar structure is compressed by the great growth of cells, which ultimately soften, degenerate, and break down into cancer-juice. This process of cell-proliferation

involves, after a time, the vaginal roof, and then begins that peculiar fixation of the uterus so characteristic of malignant disease. This infiltration may extend beyond the vaginal roof, attack the pelvic viscera, and reach the lymphatics. For a considerable time the ulceration may not attack the body of the uterus, destroying only the cervix; but ultimately the body of the womb is invaded. This cell-growth leads to death of the areolar tissue, softening, and ulceration.

Meantime the vessels supplying the cervical villi have increased in size; the latter have also become enlarged and hypertrophied. A papillomatous condition is the result. These papillæ, situated on a hardened and infiltrated base, are prone to bleed. Commencing as papillary hypertrophy, the malignant type is assumed, sooner or later, by the commingling of the characteristic nests or 'comedons' of epithelial cells, which form plugs in the submucous tissue. Rapid cell-proliferation, great increase in the villi, enlargement of the vessels, and accompanying degeneration and liquefaction of the cells, result in a sprouting or vegetating papillary growth, vulgarly known as *cauliflower excrescence*.

Carcinoma and Epithelioma of the Cervix.—Some authors (following Lebert) still distinguish carcinoma from epithelioma, or cancroid. The distinction is of some clinical importance. The pathological grounds of this classification cannot be thoroughly discussed in a work such as this. Galabin made a careful examination of thirty-four cases of cancer of the cervix, and he has described the histological character of cancroid growths as most variable.

He found, as the exception, the epithelial globes, or bird's-nest bodies. The characteristic cemented or 'cogwheel' appearance of the epithelium has been generally present in the epithelial masses—squamous in character, and bounded by 'a regular margin of columnar-like cells.' In older portions of the growths there was no cell-border to the masses. They were more or less detached from each other, in groups, and the intercellular substance was absent. Both the cells and nuclei varied considerably in the arrangement of the former and the size of the latter. In a small number of cases there was evidence of cell-proliferation of the mucous glands. In a tenth of the entire cases examined the structure was that of sarcoma or lympho-sarcoma.

According to Hart and Barbour, we may group together the researches of Klebs, Waldeyer, Virchow, Ruge and Veit, and

FIG. 375.—*a*, A collection of round and irregular large and small cells. *b*, Large space, probably vascular; *c*, loose, succulent connective tissue, many of the cells branched, and looking like myxoma cells; *d*, spindle cells and fibres, probably developed from *c*.

trace the origin of all these cervical malignant growths, either to (*a*) the cubical epithelium of the cervical glands; (*b*) the

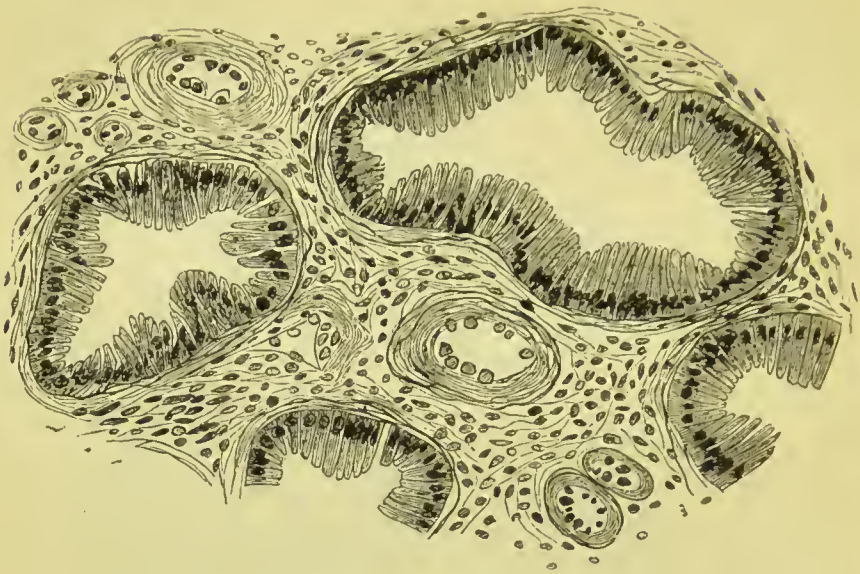


FIG. 376.

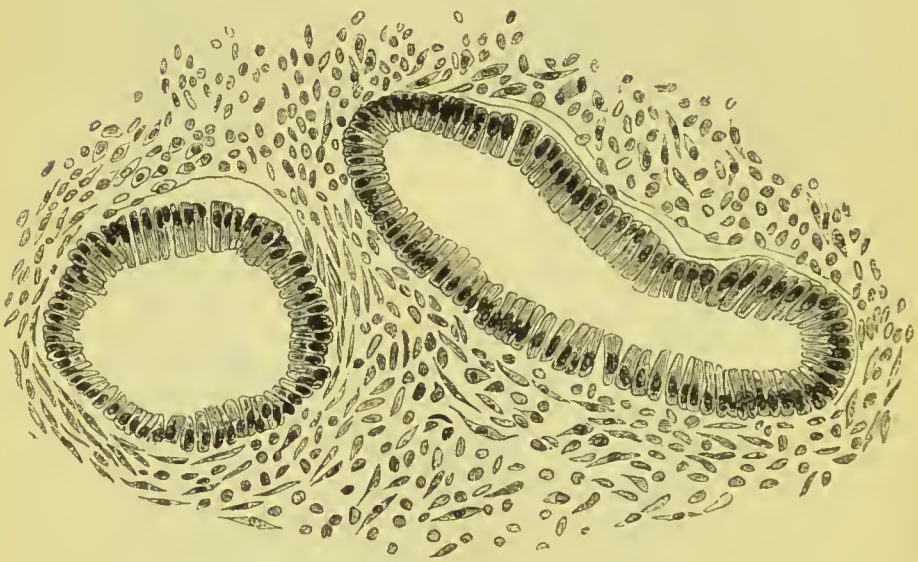


FIG. 377.—Sections showing glandular alveoli lined with columnar epithelium; matrix of embryonic connective tissue and bloodvessels in section. [In the portion figured there is no evidence of epithelial proliferation or encroachment into the surrounding tissue; other parts of the sections, however, show these conditions—*i.e.*, an approach to epithelioma.]*

deepest layers of squamous epithelium on the vaginal aspect of the cervix; (*c*) the connective-tissue cells of cervix; (*d*) the epithelium of the cervical canal.

Phineas Abraham furnished the pathological report on these sections.

The three accompanying drawings are sections of growths removed by me from the interior of the uterus by the curette. All were treated in the same manner. The uterus was dilated thoroughly, the curette was freely used, and, when bleeding was arrested, a solution of chromic acid (3i.—ʒi.) was applied on the cotton-wool holder to the cavity. Periodical applications of carbolized iodine were subsequently made.

Mrs. ——, aged 44, seen with Dr. Lithgow: peculiar hæmorrhagic tendency; epistaxis frequently; hæmoptysis on and off; hæmorrhage from bowel; slight pressure of the finger on the skin produced ecchymosis. A linseed poultice left a large livid surface; profuse menorrhagia at times. There was a syphilitic history, and she had had some stillborn children. She contracted syphillis in 1867. A digital examination of the uterus produced violent bleeding, necessitating the tampon. After palliative treatment for a little time without avail, the uterus was fully dilated, and a fungoid mass was discovered filling the fundal cavity. This was removed with curette and Sims' knife, and chromic acid solution was applied. (Such a case with our present knowledge should be dealt with by pan-hysterectomy.) The section (Fig. 375) shows the character of the mass removed. Recurrence after a period of quiescence took place, and the same treatment was again adopted. The disease soon involved the entire cervix and the vaginal roof. Death occurred in about eighteen months from the time I first saw her.

Mrs. ——, seen with Dr. Ensor of Kensington: fungoid-looking mass protruding from cervix; on dilatation the same growth was found filling the cervix, and there was also a fungoid state of the fundal mucous membrane. I cleared the fundus with the curette, and applied chromic acid solution. Carbolized iodine dressings were subsequently used. The section (Fig. 376) shows the nature of the growth removed. There has been no return of the disease.

Mrs. ——, aged 36, consulted me for slight coloured discharge and ovarian pain; had been treated for uterine enlargement and inflammation. On examination I found the os uteri filled with a mass of a raspberry appearance, bleeding on being touched. I dilated the uterus, and found a growth (Fig. 377) above the cervical canal filling the fundus. With the curette and knife I completely removed the entire mass. I applied chromic acid (3i.—ʒi.) to the cavity subsequently, and dressed with iodized phenol. She is at present (1896) in perfect health.

The views of Sir John Williams as to the usual limitation of carcinoma to the cervix uteri, and the bearing of this pathological fact on the extent of the operative interference indicated in cancer of the uterus, are well known. They are not borne out either by clinical experience or the pathological researches of others, and any deductions drawn from them as to the relative advantages of high amputation, supra-vaginal hysterectomy, or total hysterectomy, are unsustainable on statistical, clinical, and pathological grounds.

The clinical distinction of cancroid and carcinoma is said to be found in the comparatively slow progress of the cancroid or epithelioma, the more superficial situation of the latter disease in the early stage, and its spreading character. Carcinoma is more rapid in its progress, and affects by metastasis the pelvic and lumbar glands and distant organs, as the lungs and liver. The 'rodent,' 'cancroid,' or 'corroding' ulcer of Clark is a rare form of malignant ulceration. In it there is a rapid molecular death of the tissues, without any induration. Extensive ulceration is the main feature, often continuing for years before death occurs. The 'cauliflower excrescence,' or malignant vegetating papilloma, has been already briefly referred to. While the differentiation, clinically, of the different forms of epithelial cancer becomes almost impossible when the disease has lasted for any time, and ulceration has extended widely and deeply, the distinctive characters of *scirrhus*, in its slow progress, the hard and nodular nature of the growth, and the small discharge that attends its earlier stages, are quite apparent.

Causation.—I have not yet personally followed a case in which pre-existing cervicitis, whether catarrhal or granular, has gradually passed into malignant disease of the uterus. I have seen many cases in which I have been told by physicians in charge that this has occurred, but the diagnosis of malignancy has been clear on my seeing the patient. The existence of follicular hypertrophy of the neck in multiparæ, and its persistence after the menopause, is the condition I specially fear among the premonitory or predisposing conditions. Such follicular conditions I have seen terminate in carcinoma. The presence of lacerations of the cervix in some cases may be fairly looked on as a mere coincidence of the multiparous uterus; the strongest predisposing cause unquestionably is repeated pregnancies. Race seems to exert considerable influence, judging from the comparative but by no means complete immunity of the negro races. The predisposing influence of heredity and age has been already noticed.

Fig. 378.—Surface of Cervix, showing epithelial ingrowths. (Case of Author; high amputation—death fifteen months subsequently.)

'The growth is a typical example of epithelioma, anastomosing prolongations, "tubular" and irregular, extending from the surface epithelium of the os into the subjacent tissue (Fig. 378). In several of these epithelial encroachments, centripetal collections of young cells — the so-called "nests" — are formed (Fig. 380), or in process of forming. In some of these the central (newest) cells are very large, succulent, and rapidly dividing. In the tissues—fibrous and muscular—which surround the heterogeneous epithelial ingrowths, the usual small-celled inflammatory infiltration characteristic of these malignant growths is evident in several places' (Abraham).

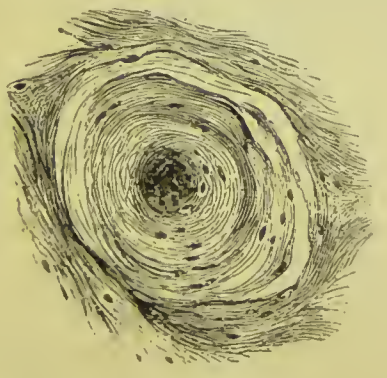


Fig. 379.—True 'nest.' (Same specimen.) *a*, Fig. 378.

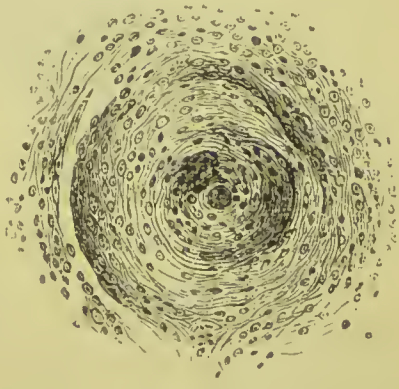


Fig. 380.—Fasciculated connective tissue. (Same specimen.)

Examination of the Uterus after Pregnancy.

American authorities insist on the importance of making an examination periodically after confinement, so as to note the appearance of any lesions that may have followed labour. Kelly advises that every woman over thirty-five years of age with a laceration should be yearly examined with this object, and Stone advises that all women in whom we have reason to suspect, through heredity or otherwise, the occurrence of cancer should likewise be examined.

Symptoms and Physical Signs.—Cancer of the cervix uteri has, as a rule, four symptoms, so characteristic that it is well to group these in the first place together. They are:

Pain;
Hæmorrhage;
Fœtid discharge;
General cachexia.

But the first important clinical fact connected with the symptomatology of malignant disease of the uterus, which it is right for the practitioner to keep in mind, is that *cancer of the womb, whether of cervix or body, may exist for a considerable time, and many or all of its characteristic symptoms remain in abeyance.* I have seen extensive carcinoma of the cervix on several occasions, where the first thing complained of was hæmorrhage. This has led to an examination, and the cancerous state has been recognised for the first time.

I have seen a patient with a large malignant excavation of the cervix; she had sought advice for severe hæmorrhage, which necessitated plugging and the use of ergot subcutaneously. She had not previously consulted anyone for the uterine trouble. There was an old history of syphilis. She declared that she had no pain, and the only thing she had noticed was the flooding. This she attributed to her 'change of life.' The vaginal roof was not involved, but the entire cervix was excavated, and bled profusely on examination. Only lately had she found foul odour from the discharge. There was no marked cachexia, and nothing to attract attention.

I have since seen several cases of an exactly similar nature, in which no pain was complained of, and the patients first sought advice when it was found too late to propose any operative measures, the peri-uterine structures being involved, and Douglas' sac. In the same way some patients suffer from erosion of the cervix and leucorrhœal discharge. They pay

little attention to this, treating it as 'whites,' and seek no advice, or they are not examined until the cervical tissues are deeply fissured and the malignant change has commenced.

The pain of cancer is generally of a burning or lancinating nature, and is especially felt at night. Early in the disease coitus is painful, and the uterus is sensitive. At other times intercourse gives rise to no pain. As the disease spreads to the vagina the pain is increased, and is more aggravated. It is felt with the movements of the bladder and rectum, and

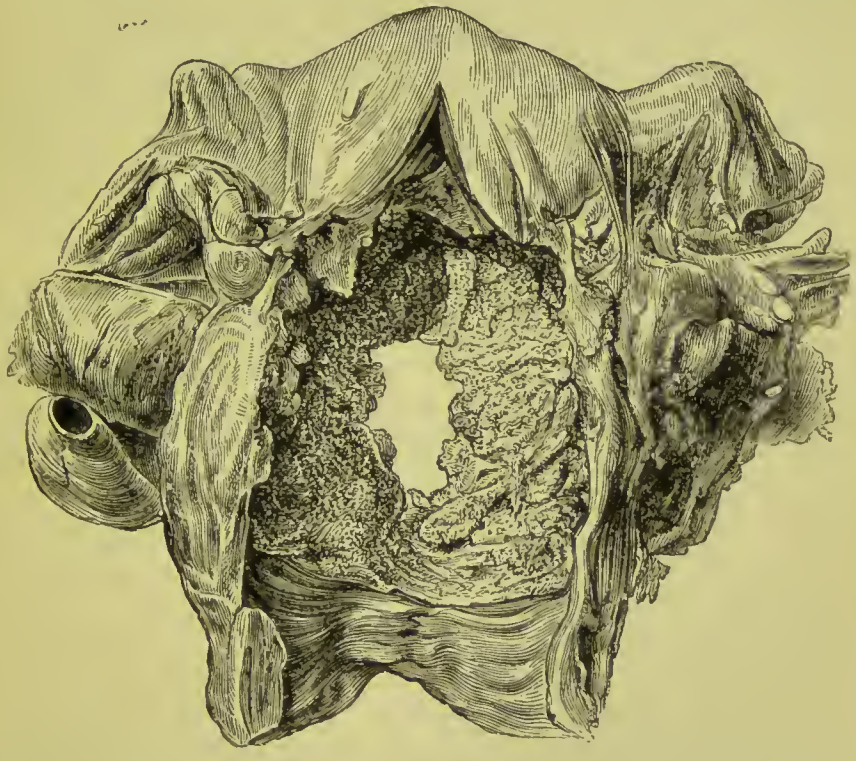


FIG. 381.—Cancer eating away the lower half of the Uterus, and perforating into the Bladder (Robert Barnes). (Half-size; St. Thomas's Museum.)

prevents sleep. The pain is often concentrated in the sacral region, and travels in the course of the sacral nerves, and extends down the backs of the thighs. Later still, it becomes intolerable, and the patient craves for morphia and sedative injections.

Hæmorrhage.—In the earlier stages of the disease, this is

the most frequent symptom. At first, it may be simple menorrhagia. The menstrual flow is increased. Perhaps there is some slight bleeding with intercourse. But after a time it becomes metrorrhagic in character, and there is either a constant or periodical discharge. The half-watery, partly bloody, somewhat fœtid, and erratic nature of the discharge in the earlier stages of malignant disease is always sufficient in itself to arouse suspicion. Finally, the tendency to menorrhagia may be the symptom most urgently demanding attention.

Fœtid Discharge.—I think it may be laid down as a safe rule in gynæcological practice, polypus, and conditions arising out of pregnancy being excluded, that if there be hæmorrhage with fœtor, we should always be suspicious of malignant disease. The fœtor arising from the putrescence of the disintegrating and necrosed uterine tissue we may look on as the most invariable accompaniment of cancer of the womb. The patient herself soon becomes aware of the odour. In the final stages of the disease, if not controlled, it pervades her clothes, and the room in which she is confined. Frequently there are most distressing renal and vesical symptoms, which are due to involvement of the ureters and bladder in the disease. The former may be ulcerated or distended through obstruction at their lower ends, and McClintock first drew attention to the occasional termination of the disease by uræmic poisoning from nephritic changes. Such renal changes consist, according to Strauss and Germont, in alterations in the papillæ and the pyramids. The former are flattened and irregular, while later on the secretory tissue of the kidney is destroyed, its place being taken by a fibrous membrane. If the bladder be engaged in the disease, the extension of mischief to the ureter and kidney is generally of a rapid character, and is rarely followed by pyonephritis, the renal consequences being due rather to the obstruction of the ureters. Lancereaux described a special form of *ulcerative endocarditis* in cases of cancer of the uterus.

General Cachexia.—Sooner or later the involvement of the system in the affection, brought about by the pain, sleeplessness, anxiety, pelvic visceral trouble, loss of blood, and constant discharge, manifests itself. There is general emaciation, and the face has the anxious, painful, and worn expression common to cancer elsewhere. In protracted cases there is a discoloured, almost icteric tint.

Physical Signs.—In the early stage of malignant disease there is not much to rely on as distinctive of malignancy. The hardness of the cervix, or the increased sensitiveness and slight hæmorrhage, are not in themselves sufficient to justify any positive decision. But the local conditions after a time leave little room for doubt. The soft and friable cervix, with the everted and hardened rim of cervical tissue; the proneness to hæmorrhage even on a slight examination with the finger; the detection of fœtor; the fixed uterus; its ragged and excavated appearance, or the presence of a vegetating, fungus-like and bleeding mass, seen with the speculum, are not, with any exercise of care, to be mistaken for laceration, erosion, areolar hyperplasia, or sloughing polypus. If the bladder and rectum be involved, the distress becomes great, and the woman's cup of suffering and misery is filled to overflowing, release from which is only to be had in death.

In all instances where a doubt exists, early in the disease, between a benign and malignant condition, the microscope should be brought to our aid, and a small portion removed and carefully prepared for examination. The typical appearances of the stroma, alveolar spaces, and nucleated cell, will enable us fairly to decide as to the malignancy or otherwise of a growth. Yet this test must ever be looked on as only one of the several proofs of malignancy on the one hand, or benignity on the other.*

* In malignant disease of the body of the uterus, where the curette is used, not only should we get a portion removed rather deeply and extending into the parenchyma, but of equal importance is it to get particles from two or three different situations.

I had several sections carefully made of a mammary tumour I removed for suspected seirrhus. In parts the elements were those of seirrhus; in parts, of adenoma; while the greater portion examined presented the typical microscopical appearance of a cystic sarcoma.

In those cases in which we resort to the microscope in uterine disease to decide this question, it is often difficult to obtain sufficient tissue to enable us to exclude the possibility of malignant infiltration. There is in uterine cancer the same tendency to return, after removal, that stamps the disease in other parts. As it progresses, the general clinical features will depend to a great extent upon the degree to which other parts or organs are involved, and the accidental complication which may arise; for example, uræmic symptoms from the involvement of the ureters, and death by coma. The rectum and bladder, the pelvic and general peritoneum, the pelvic veins, and lymphatics, may each in turn be attacked. Septicæmia, parametritis, peritonitis, phlebitis, or pneumonia may follow.

Differential Diagnosis.—Carcinoma of the cervix has been mistaken for:

Laceration, with erosion and granular degeneration of the cervix.
Papillomatous growths (benign).
Hyperplasia of cervix.
Syphilitic ulceration.
Polypus of the cervix.
Sarcoma.
Follicular hypertrophy.
Intra-uterine sloughing fibroid.

Our diagnosis must depend on these clinical facts:

1. The comparatively rapid history of the case.
2. The absence of other proofs of syphilis.
3. The age of the patient, and the evidence of heredity.
4. The presence of the characteristic symptoms and signs of malignancy: especially—pain, hæmorrhage, ichorous leucorrhœa, fœtor, rectal distress, and pain on defæcation.
5. Immobility of the mucous membrane on the subjacent tissue—early in the disease (Waldeyer)—and fixation of

the uterus. Later on, the resistance of the cervical canal to the action of a sponge-tent (Spiegelberg).

6. The involvement of the adjacent vaginal wall.
7. The tendency to resist treatment, and to return after removal.
8. The cachectic appearance of the patient.
9. The physical condition, as felt with the finger and seen through the speculum.
10. Evidence of metastasis, and of malignant growths elsewhere.
11. The microscopic appearances.

Early Physical Appearances. — Stratz has drawn special attention to the colour of the excoriated surface early in the disease :

(*a*) A yellowish-red granular surface ;
(*b*) A slight yellowish discoloration ;
(*c*) Yellowish-white, glistening, granular bodies over the surface of the cervix.

I have frequently noticed this discoloration in cases of threatening cancer, as also the dark red swollen proliferation of one lip, pretty sharply defined and somewhat elevated, described by Stratz. The vaginal mucous membrane appears also to partake of this process of discoloration and infiltration ; it assumes a yellowish or mottled look, and has a rather smooth and leather-like surface and feel.

Carcinoma of the Body of the Uterus.

There are several reasons for studying cancer of the body of the uterus apart from that of the cervix. We may epitomize these as follows :

1. It is not so common as cancer of the cervix.
2. It is a disease of more advanced life, occurring generally during or after the menopause.
3. It is found more frequently in nulliparous women.
4. Histologically it is more allied to sarcoma or adenoma.

5. The symptoms are more obscure than in malignant disease of the cervix.
6. The body of the uterus is the part affected, the cervix being comparatively free: the body may be enlarged, or hollowed out and filled with the cancerous mass; or the parenchyma may be the part principally involved.

Differentiation of Fungous Endometritis.

In an able paper on the differentiation of fungous endometritis, Heitzman (New York), commenting on the fact that it is extremely difficult to diagnose accurately some of the conditions resembling fungous endometritis, says:

'The differential diagnosis from a clinical point of view is not discussed, but from repeated microscopical examinations made upon diseased conditions of the endometrium the author concludes:

'*Endometritis Fungosa*

is characterized under the microscope by the presence of a varying number of tubular utricular glands, the epithelia of which are columnar, ciliated, but always unbroken. The connective tissue between the tubular glands may be crowded with lymph-corpuscles, exhibiting a hyperplasia of the adenoid or lymph-tissue of the uterine mucosa, or the interstitial tissue between the tubules is found to be myxomatous, or even fibrous, in nature. These differences probably depend on the age of the patient.

'*Polypoid Tumours*

consist of myxomatous tissue, and are properly termed myxomata; or if bundles of a delicate fibrous connective tissue enter the structure, fibro-myxomata. Glandular formations in such tumours are, as a rule, scant or absent; they not infrequently contain cysts.

'*Sarcoma*—

especially in its earlier stages—occurs under the clinical symptoms of fungous endometritis, mostly diffused; and the correct diagnosis can be made with the microscope only when the epithelia of the tubular glands, either the original or newly-formed, are destroyed by the sarcomatous growth.

'In sarcoma the epithelia of the utricular glands are transformed into sarcoma corpuscles, either directly by a process of division, or through the intervening stage of a coalescence into granular protoplasmic masses.

'*Papilloma of the Uterine Mucosa*

does occur in exactly the same way as on the mucosa of the urinary bladder. This form of tumour is extremely rare.

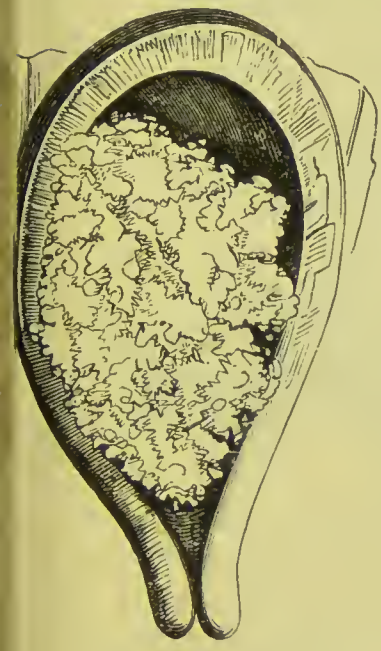
'*Adenoma*

is a rare form of tumour, sometimes appearing under the clinical features of fungous endometritis. It consists of a new growth of the utricular glands in a

plexiform arrangement with narrow calibres. The connective tissue between the epithelial formations is fibrous and scanty.

'Cancer appears in the uterine mucosa in the form of epithelioma and medullary cancer. The utricular glands are not directly formed into cancer nests, but the epithelia of the utricular glands first break up into medullary corpuscles, or into larger masses of protoplasm, from which the cancer epithelia arise.'

Pathology. — The disease may commence either in the epithelium of the uterine glands or in the parenchyma. A general thickening of the mucous membrane with disintegration and discharge follows, or scattered nodular deposits or a



382.—Carcinoma of the Body of terus (after Sir J. Simpson).

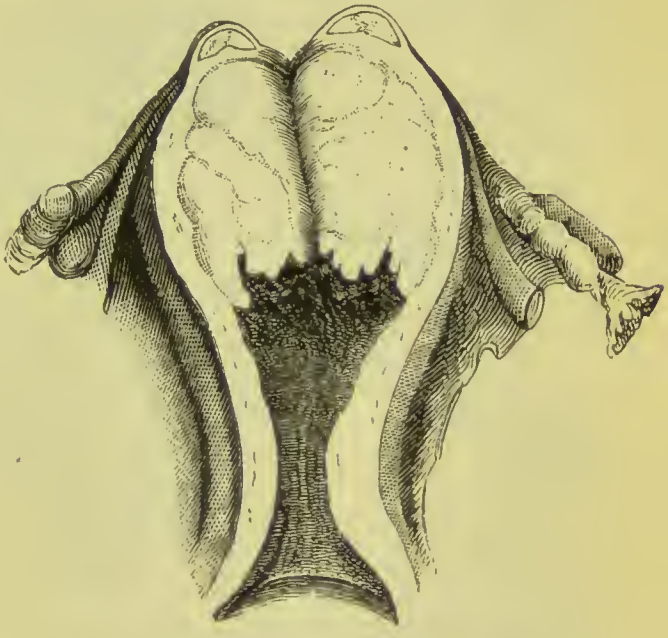


FIG. 382*a*.—Cancer of the Body assuming the polypoid appearance (Rüge and Veit).

diffused infiltration may be found. Perforation of the uterus may occur, with adhesion, and an opening into one of the adjoining organs may result.

Diagnosis. — When any patient, over forty years of age, presents herself, complaining of pain, intermittent hæmorrhage, fœtid discharge of a watery nature, at times coloured, especially if these symptoms make their appearance after the menopause, and where menstruation has ceased for some time, cancer of the body of the womb may be suspected. If on digital ex-

amination the cervix be found healthy and the fundus enlarged, and with the uterine probe some foul-smelling and discoloured discharge can be wiped from the cervix, our suspicion should be increased. The safe rule is to dilate the cervix and examine the cavity of the uterus with the finger, removing with the spoon curette two or three portions of the endometrium and subjacent tissue for microscopical examination. Such microscopical examination and careful attention to the history of the case will enable us to decide as between cancer and a *sloughing intra-uterine fibroid* or *polypus* and fungous endometritis. The chance of a mistake being made in regard to the *products of pregnancy*, if suspicious symptoms should arise in the child-bearing period of life, should not be lost sight of. If we carefully explore the cavity of the uterus, and find it enlarged, and any soft mass protruding into it, which bleeds readily and imparts foul odour to the finger, we may feel pretty certain of the disease being cancer. If, in addition, the uterus be fixed by adhesion, and there be accompanying cachexia, we need have little doubt. The microscope will dissipate any that remains.

SARCOMA.

Sarcoma is recognised, pathologically and clinically, as occurring in two principal forms, according to the structure in which it arises. This may be either the parenchyma of the uterus or its mucous membrane. In the former case it is of a more isolated character, and the nature of the growth will depend upon its subperitoneal, interstitial, or submucous situation. The submucous and subperitoneal project on the surface or into the cavity in the direction of least resistance, while the interstitial are disseminated in the tissue of the wall of the body of the uterus. Those sarcomatous growths which spring from the connective tissue of the endometrium usually take the appearance of papillary growths upon its surface, frequently infiltrating, however, the mucous membrane and involving the uterine parietes as far as its peritoneal coat. Thus, certain soft sarcomata may become attached to the

adjacent viscera, or project as soft fungus-like masses into the uterine cavity. That a fibro-myomatous tumour may change into a sarcoma is now an acknowledged fact. In a multiparous woman at the period of the menopause such a change is more likely to occur. From what has been already stated of the commencement of the generation of cancer epithelia in connective tissue, we are prepared for the actual development of sarcoma from the same elements. Jessett states that, of the cases he has operated on at the Cancer Hospital, two-thirds

FIG. 383.—Uterus removed by Vaginal Hysterectomy for Adeno-sarcoma, half life-size (Jessett—recovered).

were pronounced by the pathologists to be suffering from sarcoma. He also says: 'As to the origin of cancer of the body, it is, no doubt, often associated with fibroids.'

Symptomatology.—If we contrast the symptoms of the fibro-sarcomata with those attendant upon the diffuse variety, we find that hæmorrhage is present in both, perhaps more profuse in the latter. Semi-sanious watery discharges periodically occur in the two, but in the disease of the mucous membrane particles of necrotic tissue are washed away by the discharge, and are

found in it. Severe pain accompanies both. That of the interstitial growth, however, is more periodical, of an expulsive, 'bearing-down' character, and associated with hæmorrhage. Such pains and erratic discharges are consequently apt to be, and, as a matter of fact, often are, interpreted as menorrhagic or metrorrhagic losses associated with the menopause. There is this striking difference between the two types of disease: In the interstitial form the uterus is greatly enlarged, and frequently its canal is so dilated that we may explore and reach the intra-uterine growths with the finger. In the diffuse variety, on the other hand, though the uterus is increased in size, and possibly immovable, there is no defined tumour felt in it from without. Other symptoms in each case will depend upon the rapidity of the extension of the disease, and the degree of involvement of neighbouring parts in the pelvis, though more remote organs, such as the lungs and liver, may be affected by metastasis. The ultimate fatal issue does not differ from the corresponding termination of a case of diffuse carcinoma of the uterus, when extension has taken place to the structures surrounding it. Indeed, the course and progress of the two diseases is so alike that it is often impossible to distinguish them. Microscopic examination of portions of growth removed by the curette or finger-nail is the only means of arriving at a correct conclusion. There is in sarcoma, especially in its later stages, the same cachectic condition that we have in carcinoma. On examination of a uterus, the hæmorrhage from which renders us suspicious, should we see an irregular, soft, reddish-coloured mass protruding from the os uteri or filling its calibre, and readily bleeding, we may at once suspect sarcoma.

Differentiation.—The more frequent site being the cavity of the body of the uterus, as I have just said, it may be impossible, save by the microscope, to differentiate the two diseases. Clinically there are these distinctions:

The slower course.

The connection with sterility—twenty-five out of sixty-three cases (Gusserow).

The discharge is not so offensive and is more watery, containing grayish-white shreds of sarcomatous tissue (Hart).

Pain is not so invariable a symptom. Thomas accounts for the absence of pain in some cases, to which special attention has been drawn by Professor A. R. Simpson, by the portion of the uterus in which the sarcoma occurs. *If the sarcomatous growth be parenchymatous the pain is severe; not so, if it be diffused in the endometrium.*

Sarcoma agrees with carcinoma clinically in—

The tendency to recurrence;
The hæmorrhage which attends it;
The foul discharge after ulceration of the surface;
The pain;
The soft and friable nature of the growth in many instances;
Its fatal termination (in septicæmia, hæmorrhage, peritonitis).

For diagnostic purposes, sarcoma can only be clearly distinguished from carcinoma, fibroid growth, or chronic hyperplasia, by means of the microscope and the detection of the characteristic spindle or round cell.

Prognosis.—This, in every form of malignant disease, is most unfavourable. The average duration of life in cases of cancer of the cervix is from twelve or eighteen months to three years. Such a termination as *spontaneous recovery* has been recorded. But this is so rare that its possibility, for practical purposes, is hardly to be taken into consideration. On the other hand, if the disease be detected very early, and a partial cure be attempted by removal of the diseased tissue and the free use of the cautery, we may prolong life, if we do not succeed in curing the disease. Death ultimately takes place from exhaustion, septicæmia or peritonitis, and occasionally from hæmorrhage. The only step to be relied on for giving

the woman a chance of life for any considerable time is some form of hysterectomy.

Treatment of Cancer of the Uterus.—We may divide the treatment under the heads of 'Palliative' and 'Radical.'

Palliative and General Treatment.

The use of Paquelin's cautery.
Chloride of zinc.
Chromic acid.
Potassa fusa.
Nitric acid.
Carbolic acid.
Chlorate of potash.
Chian turpentine, internally (Clay).
Methyl violet.*

Sedatives internally :

Opium.
Morphia, subcutaneously.
Nepenthe.
Chloral hydrate ; chloralamid.
Bromides.
Cannabin.
Hyoscyamus.

Sedatives locally :

Belladonna and morphia suppositories.
Cocaine.
Anodyne washes.

Antiseptic and disinfectant vaginal washes :

Condy's disinfectant.
Chloral hydrate.
Carbolic acid.
Boric acid.

* Jessett has arrived at the following conclusion as regards methyl violet in cancer of the uterus. He used a gramme of a 1 to 2 per cent. solution for injection. He also applied a 2 per cent. solution through the vagina by tampon to the diseased surface. 'No good appeared to result from the treatment.'

Thymol.
Chloride of zinc.
Sulpho-carbolate of zinc.
Tincture of iodine.
Chinosol.

Astringents:
Perchloride of iron.
Sulphate of iron.
Tannic acid.
Alum.
Acetate of lead.

Attention to the Rectum.—The state of the rectum is of great importance. The occasional use of enemata or saline waters, and aperient confections and soft food, will do much to prevent the accumulation of scyballæ and consequent pressure on the diseased part.

Caustics.—Of various caustics, other than zinc chloride, fuming nitric acid is one of the best. Its mode of application has been previously noticed, as has also that of potassa fusa. Chromic acid (℥i.—℥i.) for relieving pain, arresting hæmorrhage, and checking the ulcerative process, I have always found of great service. The use of any of these escharotics must be combined with that of antiseptic and disinfectant applications, in order to keep the vagina free of the tissue débris, and prevent the horrible odour which is frequently present. This latter symptom Professor Sirédy recommends to be treated thus: The vagina is washed out with a solution of perchloride of mercury (1 in 3,000), after which a plug of absorbent cotton-wool soaked in a chloral solution (4 per cent.), and dusted with iodoform, is applied to the cervix. This is renewed after two days, and reapplied as often as it is deemed necessary. Condy's fluid and thymol lotion are admirable deodorants, especially the latter. Jessett recommends as a vaginal tampon equal parts of extract of pinus canadensis and glycerine; also an ointment of ol. sanitas ℥i., zinci chloridi gr. x., vaseline ℥i.

Sedatives.—Pain may be relieved both by local suppositorics

and pessaries, and the internal administration of *sedatives*. Cocaine, in my hands, both locally applied and used subcutaneously, has failed to give relief. Morphia, injected subcutaneously, is the best means I know of for relieving the pain of uterine cancer. Its use should be postponed for as long a period as possible. It is in the last stage of the affection that it is so necessary. If it be administered in the early stages, it may lose its effect, and fail to give the looked-for relief when its narcotic effect is most needed. It is a good plan to alternate the administration with some other sedative, or a different preparation of opium, given either by mouth or rectum. Chloral and the bromides, or cannabis indica, lupuline, hyoscyamus, monobromate of camphor, or conium, are also useful. It is better to give the full dose at a stated hour in the day, generally approaching night, and when the parts have been dressed and the patient has had any other local treatment completed, as, for example, an enema or vaginal injection.

Internal Remedies.—The more carefully we consider all the vaunted cures of cancer, which from time to time have been practised either by fanatics or knaves, the more we must see that the only rational treatment for cancer is comprised in the one word—operation.

Chian Turpentine.—Clay of Birmingham placed before the profession some apparently startling cures by means of the Chian turpentine. Having anxiously tried this medicine with several cases, both in the form of pills and in emulsion, I may record my experience of its effects. In several instances it certainly appeared to arrest the disease, to lessen the pain, and to check hæmorrhage. In none was the effect permanent. In other cases it decidedly checked the hæmorrhage, but did not arrest the progress of the disease. In some it had apparently no effect whatever. When I now administer it, I do so believing in its value as a hæmostatic rather than as a specific for cancer. The combination of arsenic and quinine I believe to be a valuable one in the cachexia of malignant disease of the womb.

Hæmorrhage may be controlled by styptic tampons. These must not be left longer in the vagina than twelve hours. The use of warm-water injection, 112° to 120°, should be tried, with the liquid extract of hydrastis and tincture of matico added. Internally, astringents may be given in combination with ergot, also Chian turpentine, hydrastinine, or stypticine. The *strength* of the patient must be maintained by a nourishing but not over-generous diet, as milk, when it can be taken, and liquid animal food. Wine is generally necessary; the kind and quantity will depend on the circumstances of the case. Change of air, a well-ventilated sleeping apartment, cheerful companionship—in short, everything that can contribute to make the life of the patient as fairly comfortable as the terrible nature of the malady will admit—should be advised.

Animal Extracts in Treatment of Carcinoma.—Bell of Glasgow has reported cases of carcinoma in which amelioration of the symptoms has followed the administration of thyroid extract. Its administration, however, was combined with active local treatment, the application of iodized phenol, ichthyol tampons and, in some cases, by curettage and caustics.

In cancer of the body of the uterus there is nothing to add to what has been said of the *palliative* treatment of malignant disease of the cervix. The clinical fact that obstinate costiveness and distension of the rectum occurs in cases of *scirrhus*, should not be forgotten. In a case of cancer of the body of the uterus under my care, in a lady aged fifty-five years, the fatal termination was precipitated by the accumulation of hard fæces in the rectum. Every means failed to remove these, and I had to dilate the rectum and remove some masses with the hand. One of these was of stony hardness; with difficulty I could cut it through with a knife.

Radical Operations.

High vaginal amputation.
Supra-vaginal amputation.
Supra-vaginal operation of Schroeder.
Cœlio-vaginal hysterectomy.
Vaginal hysterectomy.
Freund's operation (*abdominal pan-hysterectomy*).

Radical Treatment.—Minor Operative Steps.

Sims' operation and caustic.
Simon's spoon or écraseur, and solution of bromine (Schroeder).
Simon's spoon and cautery.
Galvano-cautery.

OPERATIVE TREATMENT.

Minor Operations.

Amputation of the cervix is performed either with the galvanic écraseur, the wire or chain écraseur (Fig. 386), scissors, or Sims' uterine knife (see p. 117). The knife is certainly preferable. In all these operations the dangers to avoid are: (*a*) Hæmorrhage, (*b*) encroaching on the bladder or rectum. The most important points to attend to are: Complete removal of the diseased tissue by cutting through to the healthy structure outside it, and the destruction of any infiltrated tissue after removal of the disease by the free use of caustic or cautery.

The Galvanic Écraseur.—The best position to place the woman in is the lithotomy one. The patient is anæsthetized. In using the galvanic écraseur, after the uterus is thoroughly exposed, the cautery loop is slipped on cold and pushed as far as possible on to the healthy tissue; the current is made, and the wire is tightened slowly; slight traction is made while it cuts through, so as to secure a funnel-shaped stump (Byrne of Brooklyn). After removal, an antiseptic, or, if necessary, a styptic, tampon is placed in the vagina.

In using the chain or wire écraseur, the uterus has to be drawn down and fixed by a vulsellum. The screw must be worked slowly. It is better to treat the stump with Paquelin's or the electric (porcelain) cautery (p. 114).

Thermo-Cautery.—Vulliet's treatment consists principally of the application of the thermo-cautery to the ulcerated cervix after free scraping of the ulcerations. If the interior of the uterus be affected, the cervix is fully dilated, a saturated solu-

tion of chloride of zinc is applied, and, after cauterization, the cavity is packed with iodoform gauze or cotton-wool.

FIG. 384.—Volkman's Spoon.*

FIG. 385.—Simon's Scoop.

FIG. 386.—Écraseur.

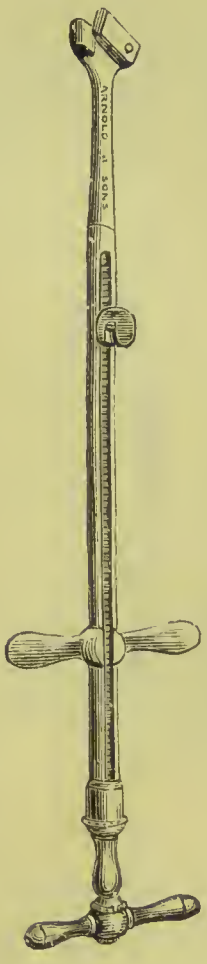


FIG. 387.—The wire can be attached without passing through the small groove at the end. By simply turning the upper portion, which rotates by means of a screw, the wire is readily admitted.

The Spoon, or Scoop.

The spoon, or scoop, must be applied freely, according to the extent of the disease. In all cases where the bladder, rectum, or vagina is involved, it is better not to interfere. If the cancerous infiltration should have encroached on the wall of the

* See various forms of curettes, p. 134.

bladder in front, or the peritoneum posteriorly, in using the spoon care must be taken to avoid opening into the peritoneum, bladder, or rectum. After the use of the spoon-curette, Paquelin's cautery, the tampon of chloride of zinc, or the alcoholic solution of bromine (Routh and Schroeder, 1 part to 5), may be used. If the latter caustic be selected, some cotton-wool saturated with the solution is pressed against the surface of the wound, and the vagina is subsequently well plugged with a tampon either soaked in a solution of, or

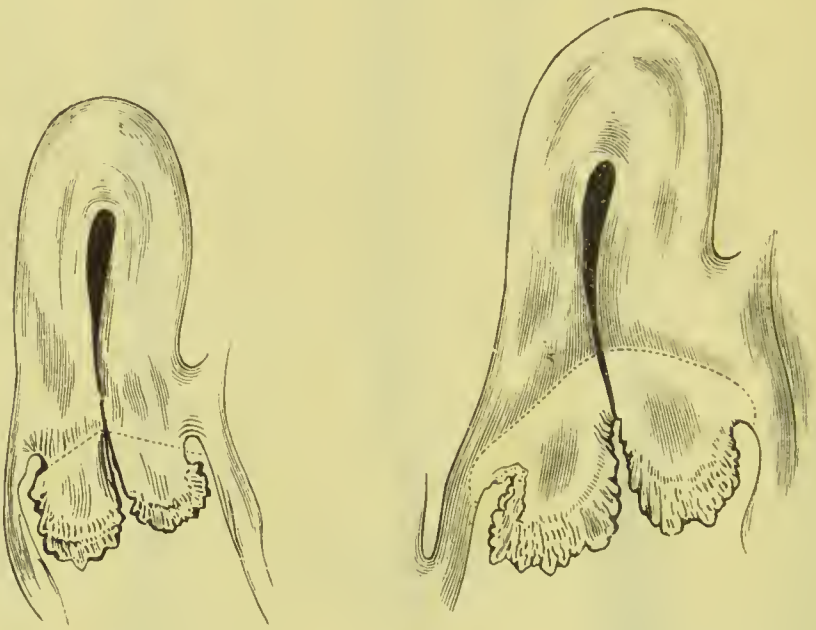


FIG. 388.—Infra- and Supra-Vaginal Amputation (Sir Spencer Wells).

covered with, carbonate of soda. The bromine tampon may be left in for twenty-four hours. The application may be renewed in about ten days if necessary.

'I have seen,' says Sir Spencer Wells, 'several cases treated by the late Wynn Williams with bromine, but not one ended satisfactorily, although temporary good was done.'

Marion Sims' Method of Treatment by Chloride of Zinc.

The steps of the method advocated by Marion Sims are as follows: (1) The removal of the bed of the diseased mass in the supra-vaginal cervix with the knife, scissors, or spoon. (2) The

cavity is dried, cleaned, and prepared for the styptic application. (3) The dried cavity is plugged with cotton-wool, which is squeezed, nearly dry, out of sub-sulphate of iron solution, or weak solution of carbolic acid saturated with powdered alum. The upper part of the vagina is packed with the same, and the lower portion with simple carbolic solution. In five days the plug is removed. A solution of five drachms of chloride of zinc to the ounce is now prepared. Some pledgets of cotton-wool are squeezed dry out of this and packed into the uterine cavity. Pledgets of cotton-wool soaked in a carbonate of soda solution are also used to plug the upper part of the vagina. The cotton-wool with the chloride of zinc is removed in five days.

I have on some occasions used chloride of zinc, with excellent results, leaving only a shell of the uterus.

Jessett showed, at the Gynæcological Society, the cast of an entire uterus removed by packing with chloride of zinc paste. He places a gutta-percha covering over the whole, and neutralizes the caustic with carbonate of soda.

Necrosis of the Uterus.—Browne and Mundé have recorded cases in which, after the uterus was curetted and tamponed by the former surgeon with zinc chloride, and by the latter with perchloride of iron, the entire uterus came away on the tenth day in both instances.

Schroeder's Operations.

Schroeder performs two operations, one an *infra-vaginal*, the other a *supra-vaginal amputation*, of the entire cervix. In both these operations the knife is used, and the wounds are closed by sutures. In the infra-vaginal operation, having first created anterior and posterior lips, a wedge-shaped portion is removed from both. In the supra-vaginal, the incisions are made through the vaginal mucous membrane in either fornix. The bladder and Douglas' pouch are carefully avoided. The cervix is cleared of its cellular tissue, and the amputation is completed by the final stitching of the anterior and posterior vaginal walls, which are united to those of the uterus.

CHOICE OF OPERATION.

On the all-important question as to the nature of the operation to be advised in carcinoma of the uterus see p. 548. Mundé and Wells ('Annual of the Universal Medical Sciences,' 1889) put the matter concisely when they state: 'The accepted indications for hysterectomy for cancer are clearly defined. The operation should be done in cases where the disease is recognised before it has extended beyond the uterus—*i.e.*, where there is no infiltration of the perimetric tissues, no glandular enlargements—but is not justifiable as a palliative measure; inoperative cases are best treated by curetting and caustics.' In this expression of opinion I cordially concur. Perhaps there is no more vital question in the entire field of gynæcological surgery than this one—What operation should be advised to a woman who suffers from carcinoma in the early stages of the disease? It seems to me that the far more favourable statistics of late operations in the hands of capable authorities clearly indicate that an operation, the mortality of which can be reduced to less than ten per cent., and the permanent results of which are in a large proportion of cases satisfactory, should be early advised for a disease in which the fatal issue under any other treatment is only a matter of time.

Bonnet and Petit lay down these general rules as regards operation. It should not be attempted unless a careful clinical examination excludes the fact of extension of the disease to the peri-uterine tissues. The most favourable time for operating is from forty to fifty-five years. After fifty-five the progress of the disease is so slow that life is but little prolonged by operating. As to the choice of operations, these authors, save in very recent cases of cancer of the neck, prefer total ablation to vaginal amputation, for the reasons already stated in the text. For the former operation they prefer the method of Schroeder, and recommend vaginal hysterectomy in the great majority of cases. Bonnet and Petit remark that in a case where disease has extended to the peri-uterine tissues, total hysterectomy is equivalent to manslaughter.

Operation by the perinæum, or after removal of the sacrum, as performed by Roux, Terrier, and others, can only be warranted in most exceptional cases of cancer of the body.* Bonnet, Petit and Pozzi give the mortality as 11 per cent. for high vaginal amputation, and for total vaginal hysterectomy—in the hands of such operators as Richelot, Léopold, Kaltenbach, Dmitri de Ott, and Goullioud—from 0·0 to 8·0 per cent.

The statistics published in this country of vaginal amputation are more favourable. Verneuil, in sixty-six cases of the latter operation, had only two deaths; the one was due to the chloroform, the other he ascribed to the écraseur. As regards survival after both operations, Schroeder, Verneuil, and Winter prefer supra-vaginal amputation to total ablation, recording cases in which life was prolonged for two years in 38 per cent., and five years in 20 per cent., and as far as seven years in a case operated upon by Verneuil.

The results of my own experience are that the average duration after high amputation is from eighteen months to three years. More recent statistics show that total hysterectomy gives a respite in the majority of cases for a period varying from two to five years.

Epithelioma of the body returns more quickly than that of the neck. Sarcoma also relapses rapidly.

Pozzi thinks that total hysterectomy is preferable to amputation, even in cases where the cancer is very circumscribed. He considers that it alone affords a certainty of removal of the whole of the disease, and that the more the danger of total hysterectomy is reduced, as it at present decidedly is, the less it differs in this respect from amputation.

There are some important statistics of Léopold of the results of vaginal hysterectomy for carcinoma. Of 164 patients, 10 died soon after operation, and 50 of recurrence, while 11 died later of other affections. Septic peritonitis accounted for 7 of the deaths after operation. In 7 of the cases it was impossible to prevent infection of the wound (Léopold). The termination of 3 cases could not be traced, and 90 were alive when the results were published. Of the 50 who died after recurrence, the average duration of life was 19 months. Of the 90 known to be still living, 74 remained free from recurrence. Of those operated on, the disease recurred in 76 who survived operation—47 per cent. As to the average duration of life after the operation, it may be gathered from the following statistics:

Longer than	2	years	there live, of	104	operated on, 58
,,	3	,,		84	,, 45
,,	4	,,		61	,, 38
,,	5	,,		47	,, 29
,,	6	,,		33	,, 22
,,	7	,,		21	,, 16
,,	8	,,		8	,, 6

Of these 104, 7 have recurrence, and the length of time from the operation till the recognition of recurrence was:

In	1,	over 8	years.
,,	1,	about 7	,,
,,	1,	,, 6·5	,,
,,	1,	,, 5·9	,,
,,	1,	,, 4·4	,,
,,	1,	,, 4·2	,,
,,	1,	,, 2·6	,,

* See Zuckerkandl's operation, p. 560.

'I think,' says Jessett, 'that we may adopt the rule: *That when the disease has extended beyond the cervical canal, or has commenced in the fundus of the uterus, and the uterus itself is freely movable and readily drawn down to the vulva, that such cases are suitable for operation. But if the disease have extended to the broad ligaments, if the vaginal wall be seriously implicated, or we can feel any enlargement of the lumbar or sacral glands, and the uterus be fixed, then it will be wise to either leave matters alone, or to adopt some palliative measures, to which I have alluded.*'

In a long and important review of the entire subject of colpo-hysterectomy for malignant disease, by Mary Dixon Jones, which appeared in the *American Journal of Obstetrics* (vol. xxvii., No. 5, 1893), this distinguished American gynæcologist recapitulates all the arguments, statistical and other, which have been advanced on the side of high hysterectomy or of high amputation. She evidently ranges herself rather on the side of the localists in the etiology of cancer, and as a believer in the power of the knife to effect a cure in a fair proportion of cases. In this view I am quite with her. I have seen lately two patients, both of whom were operated upon by me over ten years since for undoubted cancer of the breast, who are at present in perfect health. M. Dixon Jones takes the statistics of Léopold, Schroeder, Fritsch, and Martin, advocates of vaginal hysterectomy, as also those of Olshausen, Williams, Lane of San Francisco, Bilroth, and Esmarch, to show that, both on the grounds of prolongation of life and radical cure, this operation, though it gives a mortality of from 20 to 25 per cent., is justifiable. And, further, she argues that this mortality must be considerably diminished with increased experience, and Boldt, Cushing, Kurz, Montgomery, Richelot, are quoted as arguing in favour of hysterectomy, on the ground that it is impossible to define the limits of the disease from any examination of the cervix. The rapid spread of the malignant cells by means of the lymphatics is undoubted. As I have always argued, every sound surgical principle which we are guided by in treating cancer elsewhere in the body is on the side of total hysterectomy, nor, indeed, can the advocates of the partial operation now prove that the mortality from it, when it is thoroughly and efficiently performed, is much below that of the major step. As Sinclair well says, 'Though called major, it is perhaps less dangerous than some of the so-called minor operations.'

The authoress of the paper referred to insists on the necessity for microscopical examination in all cases where there is a suspicion of malignant degeneration, or any tendency to it, in the uterine cervix. Caustics and cautery do not find much favour with her, nor is she influenced by the results of the treatment by Byrne with the galvano-cautery, and the free charring 'up to and beyond the supposed danger line' by 'a free and fearless cauterization.' Emmet strongly objects to the galvanic wire or écraseur, as also does Jessett.

This is the view of the question which has appeared in previous editions of this work, and nothing has occurred to make me alter it. The discussion on Cullingworth's paper, read at the Obstetrical Society in 1890, in which the author took part, but served to strengthen his view that vaginal pan-hysterectomy, or at least supra-vaginal hysterectomy, with the full declaration of its risks to the patient, is the proper step to advise in uterine carcinoma *when it is once declared.* Sir Spencer Wells remarks ('Morton Lecture on Cancer,' 1888): 'After what I have said, it cannot be surprising that in any case where can-

cerous disease has extended much higher than the os, and there is good reason to believe from the mobility of the organ that the surrounding tissues are still free from invasion, *I advise total excision as the best practice.*'

Vaginal Hysterectomy.

Pathological Changes in the Corporeal Endometrium in Carcinoma.—As bearing on early operation, and the choice of vaginal hysterectomy and removal of the entire uterus, or partial removal by high amputation, the researches of Abel are of importance. He shows that the corporeal endometrium is much more frequently affected in cervical carcinoma than was believed hitherto, the change being of the nature of round or spindle-celled sarcoma. This fact would operate in favour of complete extirpation.

If the all-round mortality of both vaginal hysterectomy and supra-vaginal amputation of the cervix be 10 per cent., then it would appear preferable to recommend the more radical step, at least in those cases in which there is a prospect of recurrence of the disease. In drawing attention to some of the accidents of Schroeder's operation,* Reeves has given so clear a description of it that I reproduce it :

Schroeder's Operation.

'The vagina should be thoroughly cleansed at the time of operation, and for two or three days previously. The cervix is well drawn down and backwards with the vulsellum forceps, and its mucous membrane divided in front, well above the disease and clear of the bladder. The bladder is then carefully separated from it by the handle of the scalpel, a sound being kept in the bladder, so as to recognise and keep clear of this organ. If the bladder be well separated to just above the level of the internal os, in front and somewhat to the sides, it and the ureters will retract up out of harm's way. The cervix must now be carried forwards, and the mucous membrane on the posterior wall divided. This incision may join the anterior one, but the lateral parts of the cut must only pass through mucous membrane. In reflecting the mucous membrane from the posterior surface, care must be taken not to open the peritoneal pouch of Douglas, though if the posterior part of the cervix must be divided high up, to be well clear of the disease, it may be well to open the pouch and remove that portion of it on the posterior part of the cervix. Now, the cervix must be freed at its sides from the firm connective tissue, and as

* 'Ueber die theilweise und vollständige Ausschneidung der carcinomatösen Gebärmutter,' article, *Zeitsch. f. Geburtsh. u. Gyn.*, vi. 2.

large branches of the uterine artery and the main trunk itself with accompanying veins lie here, it is best to tie before cutting. An aneurism-needle, carrying stout carbolized silk, is passed from behind forwards on both sides as high up as the cervix is cleared, and sufficiently close to the uterus to allow of enough tissue for the ligatures to hold on by, and these are firmly tightened; then scissors cutting between the uterus and ligatures will free the cervix all round. These lateral ligatures not only check bleeding when dividing the lateral connections of the cervix, but also much diminish the flow when the uterus is subsequently cut into. The operation is completed with the knife, dividing the anterior uterine wall as high up as necessary until the cervical canal is opened; then a firm and sufficiently deeply placed median suture is passed through the anterior vaginal wall and uterine tissue above the incision to prevent retraction during division of the posterior wall. This is now cut through at the desired spot well above the disease, and the stump of the posterior lip sutured to the

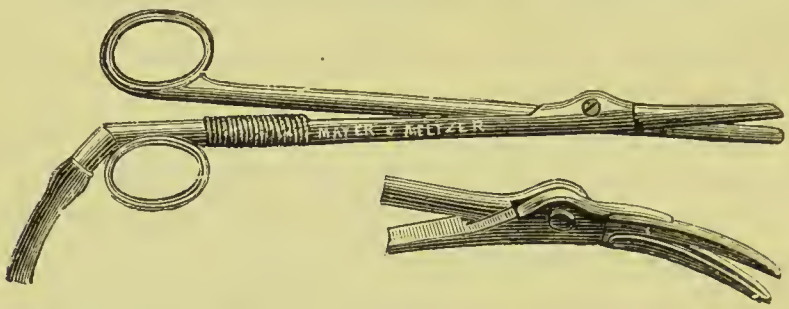


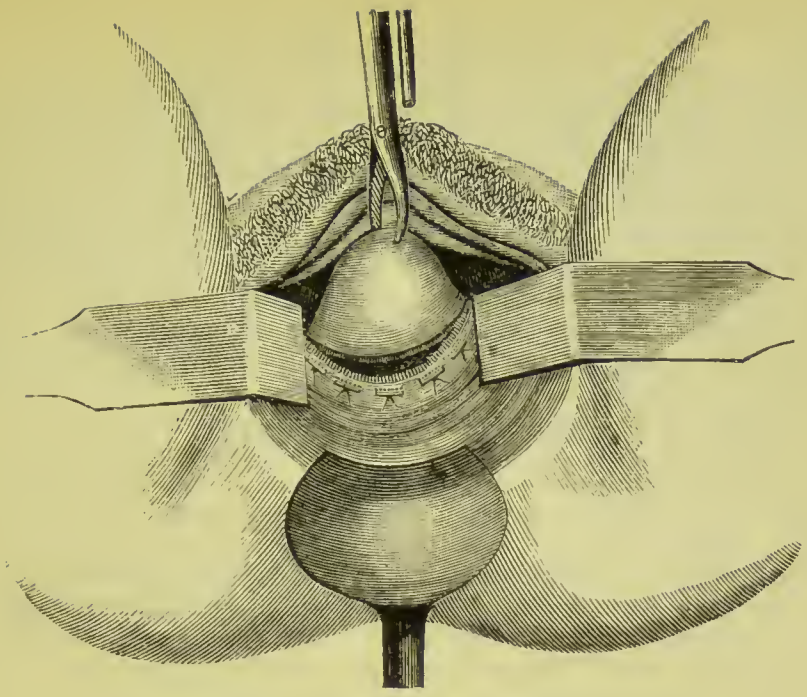
FIG. 389.—Cautery Scissors.

mucous membrane of the posterior vaginal wall. The wounds in the lateral fornices should be closed by deep sutures, which help to control hæmorrhage. Any vessels giving trouble must be separately secured. The after-treatment consists in thorough cleanliness—syringing two or three times a day after the first twenty-four hours with either warm weak carbolic, Condy's, or mercurial solutions (1 in 2,000)—and easing pain for the first day or two by opiates. The urine should be drawn off every five or six hours, and the bowels kept confined for three or four days, and then relieved by a saline purge or enemata. The diet should be nourishing and liquid until all fear of complications has passed off, when fish, fowl, and a little stimulant may be given. The after-complications are hæmorrhage, cellulitis, peritonitis, and uterine lymphangitis, which must be met early with appropriate means.'

Récamier's Vaginal Operation.

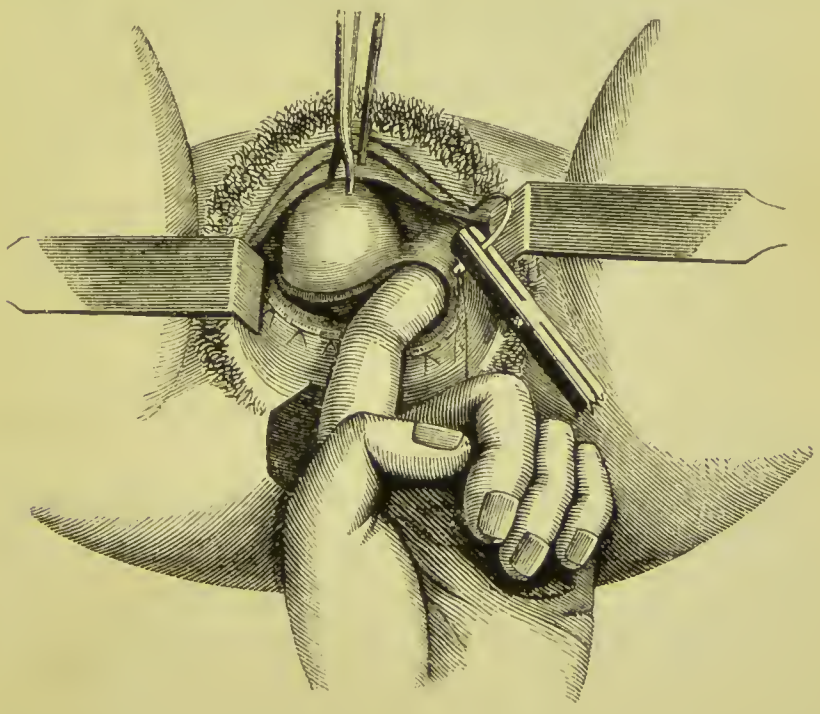
The full details of Récamier's vaginal operation have to be most carefully studied, and the operation performed a few times on the cadaver by anyone undertaking it for the first time. The steps of the operation are:

1. Separation of the cervix from the bladder, as in the supra-vaginal operation, the ureters and peritoneum being avoided.



Schroeder's Operation (Martin).

FIG. 390.—Posterior Cul-de-sac opened; Suture applied to Peritoneum. The opening into Douglas' pouch after the vaginal wall has been sutured to the peritoneum.



Schroeder's Operation (Martin).

FIG. 391.—Suturing the Lateral Structures in the Pelvic Floor after the opening of Douglas' Pouch (Martin, 'Annals of Gynæcology'). Martin uses ligatures for the control of hæmorrhage from the broad ligaments.

2. Opening of the pouch of Douglas through the posterior vaginal vault, and detachment of the peritoneum at either side with the fingers.

3. The opening of the peritoneum anteriorly, which is effected either by introducing the finger through the posterior wall into the utero-vesical pouch, and cutting on these through the anterior wound, or a blunt expanding perforator (Reeves) may be used to make the opening and admit the fingers, so that the peritoneum may be torn to the desired extent.

4. Retroflexion of the uterus, and forcing of the fundus through the posterior wound. If the uterus be large, a forceps is used to bring the uterus to the vulva.

5. Ligation of the broad ligaments, and possible removal of the ovaries and Fallopian tubes. With reference to this part of the operation, Reeves urges the advantage of using the hysterectomy compression forceps (clamp forceps) of Richelot to secure the broad ligaments at either side of the uterus before their division. These forceps are permitted to remain on to the morning of the third day, and partly act as drains after the operation. In their application care has to be taken to avoid intestine. Their application, Reeves contends, lessens the danger of shock and hæmorrhage, and considerably shortens the operation. The advantage of this clamp forceps over sutures has been established by several operators.

6. Careful antiseptic dressing of the vagina and drainage of Douglas' sac.

A. Martin's Operation.—Martin ('Annals of Gynæcology') divides this operation as performed by him into four steps :

1. Ligaturing the base of each broad ligament, thus constricting the uterine arteries.
2. Opening of the posterior cul-de-sac of vagina, and the suturing of the peritoneum to the vaginal wall.
3. Opening the anterior cul-de-sac, and suturing the peritoneum to the vaginal wall anteriorly, by carrying the finger forwards at either side of the uterus, through the opening made in the posterior cul-de-sac, and then opening the peritoneum at either side and suturing.
4. Ligaturing the broad ligaments and dividing the structures at either side of the uterus, between the ligatures and the uterine wall.

Accidents during Operation.—(*a*) Hæmorrhage. The steps for controlling this have been described.

(*b*) Wound of the ureter or bladder.* This accident must be avoided by keeping as close as possible to the anterior neck. Pozzi advises that the uterus should not be retroverted until the neck is completely separated anteriorly, and that the long forceps should not be placed too deeply on the broad ligament.

* See chapter on Ureteral Surgery for the operative surgery of wounds of the bladder and ureters in hysterectomy.

(*c*) If the bladder be opened, the wound should be immediately sutured, and a self-retaining catheter placed in it.

Secondary Hæmorrhage.—Should this occur after operation, the vagina should be tamponed with iodoform gauze. If it persist despite of this, it may be necessary to arrest it by pressure-forceps, which are left in position. The other more grave consequences are shock, uræmia, and septicæmia. It is

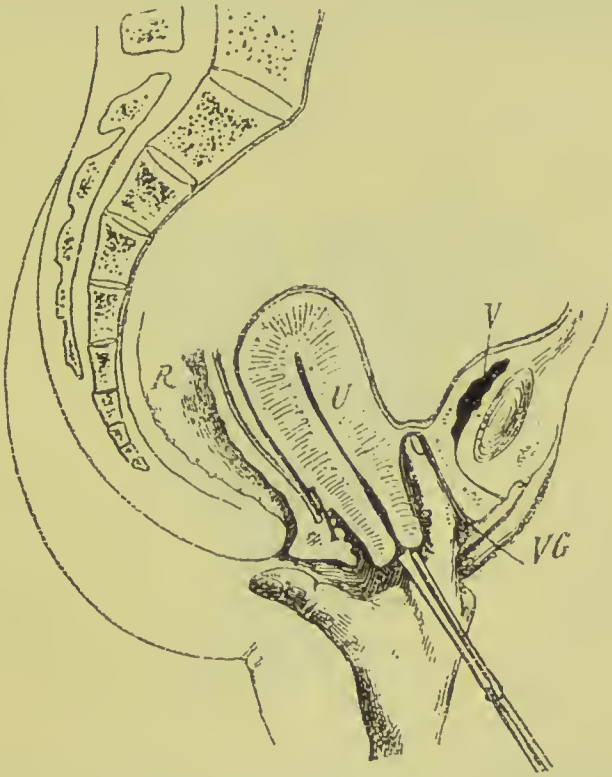


FIG. 392.—Opening of the Recto-uterine Cul-de-sac, and Detachment of the Bladder with the Finger (Doyen).

well to remember that, before performing the operation, it is right to exclude the presence of any chronic renal disease.

Doyen's Method of Vaginal Hysterectomy.—The patient having been duly prepared, and the vagina dilated for forty-eight hours previous to operation by an air pessary, the bladder is emptied and the vagina thoroughly disinfected. The patient is placed on her back. The cervix is seized laterally by two clamp forceps, and the uterus is drawn down as far as possible.

With a blunt scissors a circular incision is carried round the neck of the uterus through the vaginal cul-de-sacs. The posterior cul-de-sac is opened with the right index-finger, and the uterus is separated behind from any adhesions, if these exist. The decision as to removing the entire uterus may be determined at this stage by a further examination made through the opening. With the greatest care the bladder is now separated, and injury to the ureter if possible avoided.

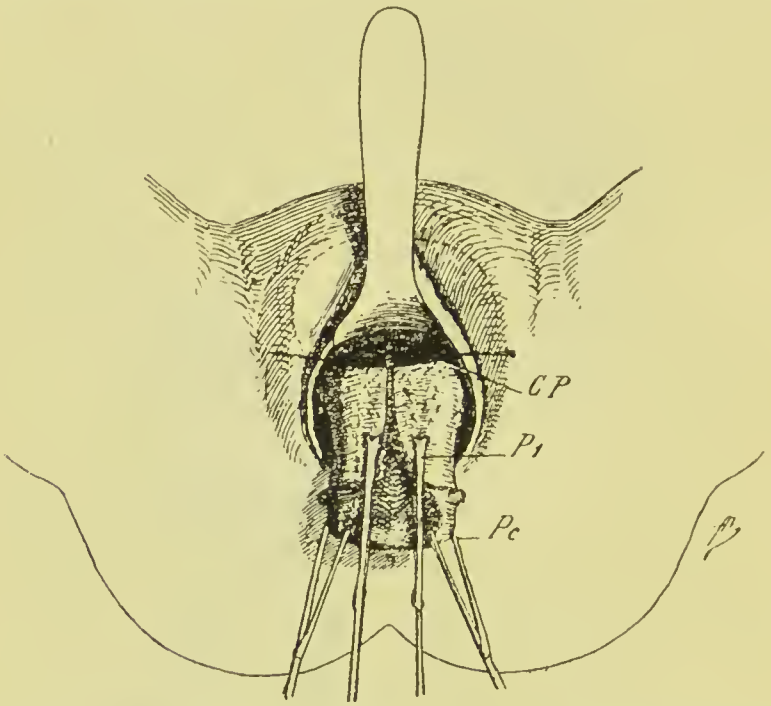


FIG. 393.—Application of First Forceps to the Broad Ligament, introduced almost vertically. The uterus and annexa are drawn outside the vulva (Doyen).

This is done with the finger. The uterus is now well drawn down, free from its posterior and anterior attachments. With a vaginal retractor the anterior wall is drawn forwards, and a longitudinal incision from below upwards is made in the anterior wall of the uterus in the middle line of the uterine neck. At either side of this incision two other clamp forceps are placed, and its lips are drawn down. It is prolonged

upwards as far as the fundus of the uterus by means of scissors, while with two other forceps, applied higher, the sides of the section are seized, until the summit of the fundus is reached. Unless the vulva be very narrow, or the uterus greatly increased in size, the fundus is readily turned over, and the section of the broad ligament is proceeded with. The fundus of the uterus having been drawn down outside the vulva, and with it the annexa, a special forceps, with elastic blades,

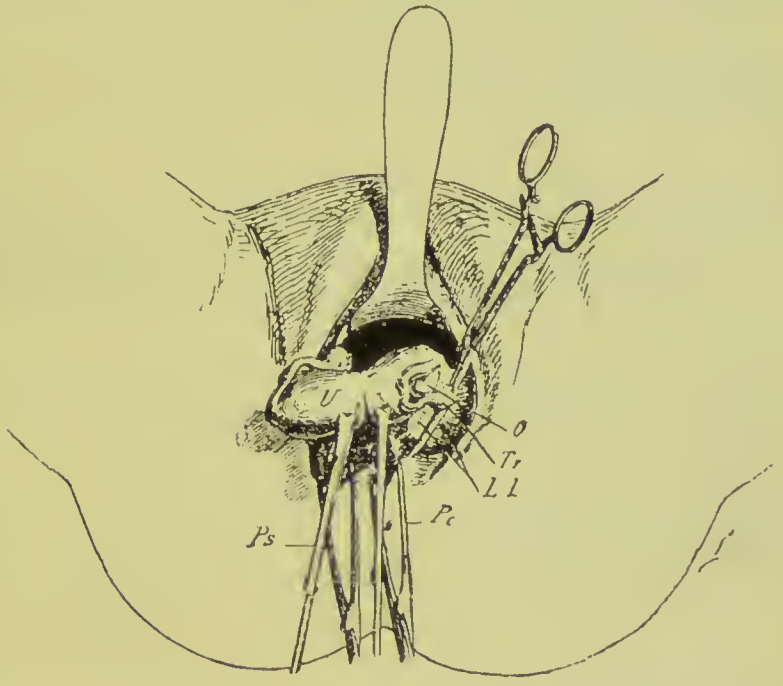


FIG. 394.—Prolongation of Longitudinal Section to the Fundus; application of second pair of forceps (Doyen).

is placed on the left broad ligament, which is grasped by the left hand, and the first forceps seizes it almost vertically, one of the blades grasping it in front and the other behind, while care is taken, by guiding these with the left forefinger to the level of the posterior cul-de-sac, that the entire mesometrium is included, and, on the other hand, that no other structure is seized. The forceps is now tightly closed, and a second, more slender, pair is applied for security below it, and the broad ligament is divided a few millimetres from it. The

right ligament is treated in the same manner. Should the large forceps, though this is extremely rare, not be readily applied above the annexa, a smaller forceps is placed on the other side of the ovary and tube, and these are resected. A sterilized compress is used as a tampon, the anterior and posterior peritoneal flaps being carefully laid bare. The large forceps is withdrawn at the end of forty-eight hours, and is easily detached. The small one is removed at night, or on the following day with the gauze, should this latter not retain its position. Rarely, and only in the event of the uterus being very large or the vulva contracted, is it necessary to prolong or alter the uterine incision, or to divide the vulva, as has been done by Chaput. In the case of a very large uterus, it may be necessary either to bring away pieces of the anterior wall by *morcellement*, so as to reduce its bulk, or to make a large V-shaped flap on the anterior wall, the surface of which is used for seizing the uterus in order to draw it over as I have described. Thus, again, the bulk of the tumour is diminished.

Jessett's Method.—Jessett thus describes the steps of his operation :

The patient for some days previous to operation should have the vagina thoroughly douched out with either perchloride of mercury solution (1 in 5,000) or strong carbolic acid solution (1 in 40). On the day previous to the operation a dose of castor-oil or a good dose of salts in a tumblerful of hot water should be given early in the morning. On the morning of operation a large enema should be administered.

Early in the morning some strong beef tea should be given, and another enema about four hours previously to the operation. And just before the patient is placed on the table an enema of three ounces of beef tea and one of brandy is administered if she be very weak.

The patient is placed in the lithotomy position by means of a Clover's crutch. The vagina is well washed out with a strong solution of carbolic acid (1 in 40). A Sims' speculum is introduced into the vagina, and the edges of the diseased uterus seized with vulsellum forceps, and is drawn well down towards the vulva.

A bladder-sound is introduced into the bladder to define its relation to the cervix of the uterus. This having been ascertained, the mucous membrane of the vagina is divided as far away from the diseased part as possible, and the cellular tissue around the cervix is detached as in the operation for supra-vaginal amputation.

The bladder is pushed well forward with the finger or blunt edge of scissors, and the peritoneum is recognised in the front of the uterus. This must be

divided freely. The next step is to open up the peritoneum in Douglas' pouch. This being done, by placing the forefinger of the left hand into the peritoneal cavity in front of the uterus and the thumb behind, it is easy to grasp the broad ligament. The uterus being now drawn well down, a few snicks are made with the scissors on each side, and the uterine arteries are readily recognised.

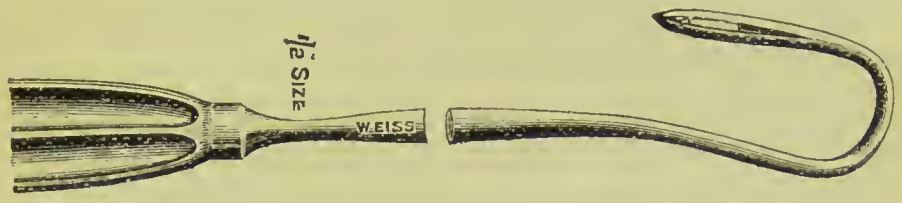


FIG. 395.

FIG. 396.
Jessett's Hysterectomy Needles.

The operator now passes a long broad ligament needle (Figs. 395, 396) on the flat, either anteriorly or posteriorly, as may be wished, along the surface of the uterus. The point being felt just above the uterine arteries, it is depressed, and forced through the broad ligament, being brought into the vagina through the opening on the opposite side, when, from the length of the arm, it readily

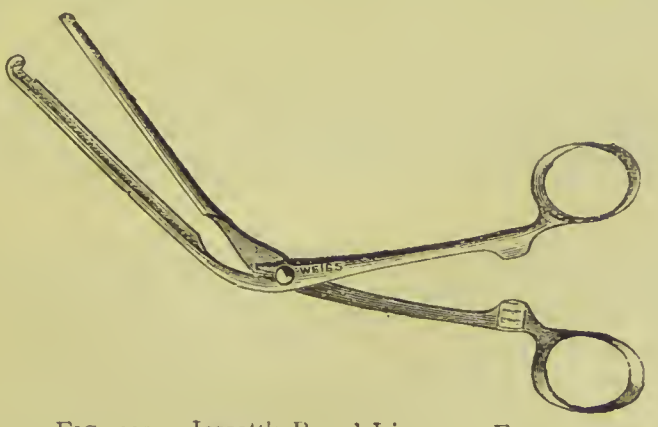


FIG. 397.—Jessett's Broad Ligament Forceps.

projects through the vulva, and is threaded with No. 4 Chinese silk and withdrawn; the ligature is tied tightly about an eighth of an inch from the uterus. A pair of pressure-forceps is applied between the ligature and uterus, and the parts are divided with scissors. The same manœuvre is carried out on the other side. The uterus is now found freely movable, and it is an easy matter

in these cases in which the uterus is not enlarged, and the vagina is fairly roomy, to either antevert or retrovert the uterus. All the vulsella forceps are to be removed. The uterus being turned over, the ovaries and tubes are readily brought into view, the ovarian arteries are ligatured, and the broad ligament is divided on each side.

The uterus then is removed, and all bleeding being arrested, the cavity of the abdomen is flushed out with sterilized water or a weak solution of boric acid. The anterior and posterior flaps of the peritoneum are seized with forceps and drawn well down, a glass drainage-tube is inserted, and the vagina is packed with iodoform gauze. Finally, a winged catheter is placed in the bladder, and a morphia and belladonna suppository in the rectum. The patient is returned to bed, and hot-water bottles are placed around her. If all go well the dressing should not be removed until the third or fourth day.

Cœlio-vaginal Operation.—In some cases in which the uterus is very large, and great difficulty is experienced in delivering the organ *per vaginum*, it is better, after the cervix has been freed and the uterine arteries secured, to open the abdomen in the middle line above the pubes, and ligature the broad ligaments through the opening from above downwards.

In doing this the patient should still be secured in the lithotomy position, and the surgeon should stand in the same position as for vaginal hysterectomy, as he then has complete control of the vaginal, as well as the abdominal, opening. The enlarged uterus being removed by the abdominal wound, the peritoneum should be flushed out, and the wound closed in the ordinary way. The remaining steps of the operation are the same as those already described for vaginal hysterectomy.

In some cases of elderly unmarried women it will be necessary to divide the perinæum to obtain room for manipulation. This, however, should never be done if it can be avoided, as there is always the risk of opening the rectum. In connection with the operation several important questions of detail arise.

There is a considerable difficulty in many cases in applying the ligature.

To avoid this, Jessett has had needles made, fashioned in such a manner that there is a long arm from the bend in the needle to its point; it is also furnished with a large eye so as to be readily threaded. These needles can be easily slipped over the uterus and made to pierce the broad ligament at the spot desired, the point being brought out into the vagina and threaded. By this means it is very much easier to ligature the uterine arteries and lower part of the broad ligaments than by any other needle. The vagina is antiseptically tamponed. No drainage-tube is, as a rule, introduced; but those cases in which there is much tearing or difficulty in getting the uterus out, I consider, should always be drained by the vagina. Jessett prefers glass drainage to rubber tubes, for the reason that they do not collapse when the vagina is packed, and, being firm, any oozing is suppressed by means of the pressure that

is exercised. The tube can be removed at the end of twenty-four or forty-eight hours if there be no sero-sanguineous discharge. A narrow slip of gauze should be introduced into the tube.

The next point of importance—and this is one to which too much attention cannot be paid—is the treatment of the peritoneal flaps.

Some surgeons unite these flaps by a continuous suture ; others leave them alone. Experience has taught that the first of these two lines of practice is unnecessary, and the other is fraught with great danger. If the position and condition of these flaps be examined after the uterus is removed, invariably the peritoneum is found curled up and doubled upon itself, so that if they be left alone the whole raw surface has a tendency to drain into the peritoneal cavity. Moreover, should there be any oozing into the peritoneum, this very doubling up of the flaps would be apt to prevent its discharge through the vagina. There is great danger also of a knuckle of intestine becoming adherent to the wound, and trouble being created by this. It is the want of attention to this detail that has led to disaster in many cases. To overcome this, Jessett catches the edges of the flaps with long curved forceps, fixing two pairs of forceps on to each flap. He draws these firmly down, keeping the ends of the forceps approximated, and then packs strips of iodoform gauze firmly on each side of the flaps so as to cause the peritoneal surfaces to be brought into accurate apposition. By adopting this practice there is no necessity to unite the flaps by suturing. Should the drainage-tube be inserted, the flap is drawn well down in the same manner.

Léopold lays down the following rules :

'1. The anæsthetic must be given quietly by a practised hand, to prevent straining and vomiting, which easily force coils of intestine into the wound, and may cause ileus.

'2. Patients in whom the disease has spread beyond the mucous membrane into the muscular tissue are not suitable for operation.

'3. The fouling of the wound by fæces is most important, and, should it occur before the peritoneum be opened, the operation is to be abandoned, or confined to such measures as do not open the peritoneum.

'4. There is great danger in effusion of pus into the wound from the cancerous mass (pyometra), or from inflammatory pelvic foci (ovarian abscess, pyosalpinx, etc.); such an accident requires the most minute care in the cleansing of the wound.'

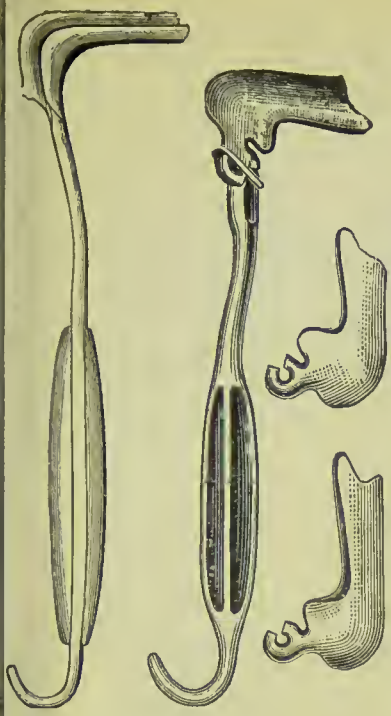
Also the following corollaries are added: '1. That the

patient should be operated upon as soon as possible. 2. That the removal should be effected as widely as possible from the disease. 3. That, especially in corpus-carcinomata, no carcinomatous matter should be allowed to come into contact with the fresh wound.'

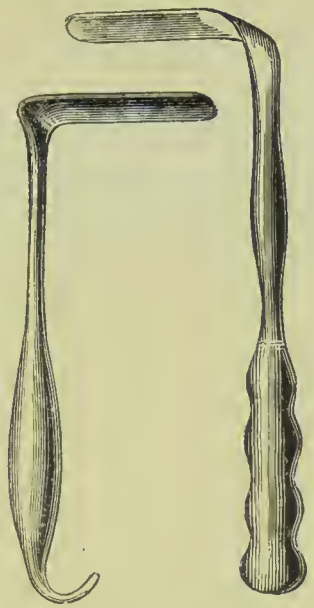
Hysterectomy by the Sacral Method.—E. Zuckerkandl and Wölffler extirpate the coccyx and the lower portion of the sacrum. A long and curved incision is made towards the left or right side for about 10 centimetres in length, stretching for about 3 centimetres above the sacro-coccygeal articulation, the concavity of the curve being towards the left side. The coccyx, when divested of its periosteum, is extirpated. The necessary length of the sacrum is also removed with as little disturbance to the sacral nerves as possible. The rectum is drawn laterally, and Douglas' pouch is opened. Through this space the uterus is removed. The greatest care has to be taken to wound neither the bladder nor ureter. Hochenegg has published the results of successful operations, where the uterus was too large to remove by the vaginal method. Hégar has modified the operation by converting it into an osteoplastic one, only temporarily resecting the sacrum and coccyx, and replacing these after the hysterectomy.

Extirpation of the Entire Uterus through the Abdominal Wall.—This operation, associated with the name of Professor Freund, of Breslau, is one which, even in the hands of the ablest operators, has not been sufficiently satisfactory to warrant any definite conclusions. Full particulars of the steps of the operation will be found in all the larger works on obstetrics. From the statistics which have been published of the Porro-Freund operation in cases where malignant diseases of the womb complicated pregnancy, it would appear that this operation offers the patient the best chance. This question, however, is one more fitly discussed in a work on obstetrics

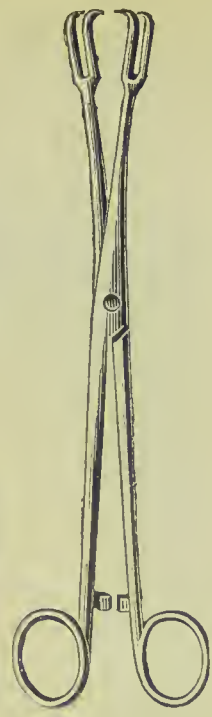
PLATE III.



Retractors (A. Martin).



Retractors (Olshausen).



Double tenaculum (Schroeder).

Double Curette (A. Martin).

Lateral Ligament Needle-hooks for seizing and drawing out thread (Olshausen).

Clamp Forceps (Richelot).

Sponge-holder (Windler).

Needle-holder (A. Martin).

Trocar and Dilator for Pelvic Abscess (Landau).

ADDITIONAL HYSTERECTOMY APPLIANCES (WINDLER, BERLIN).

(Fig. 562.)

PLATE IV.

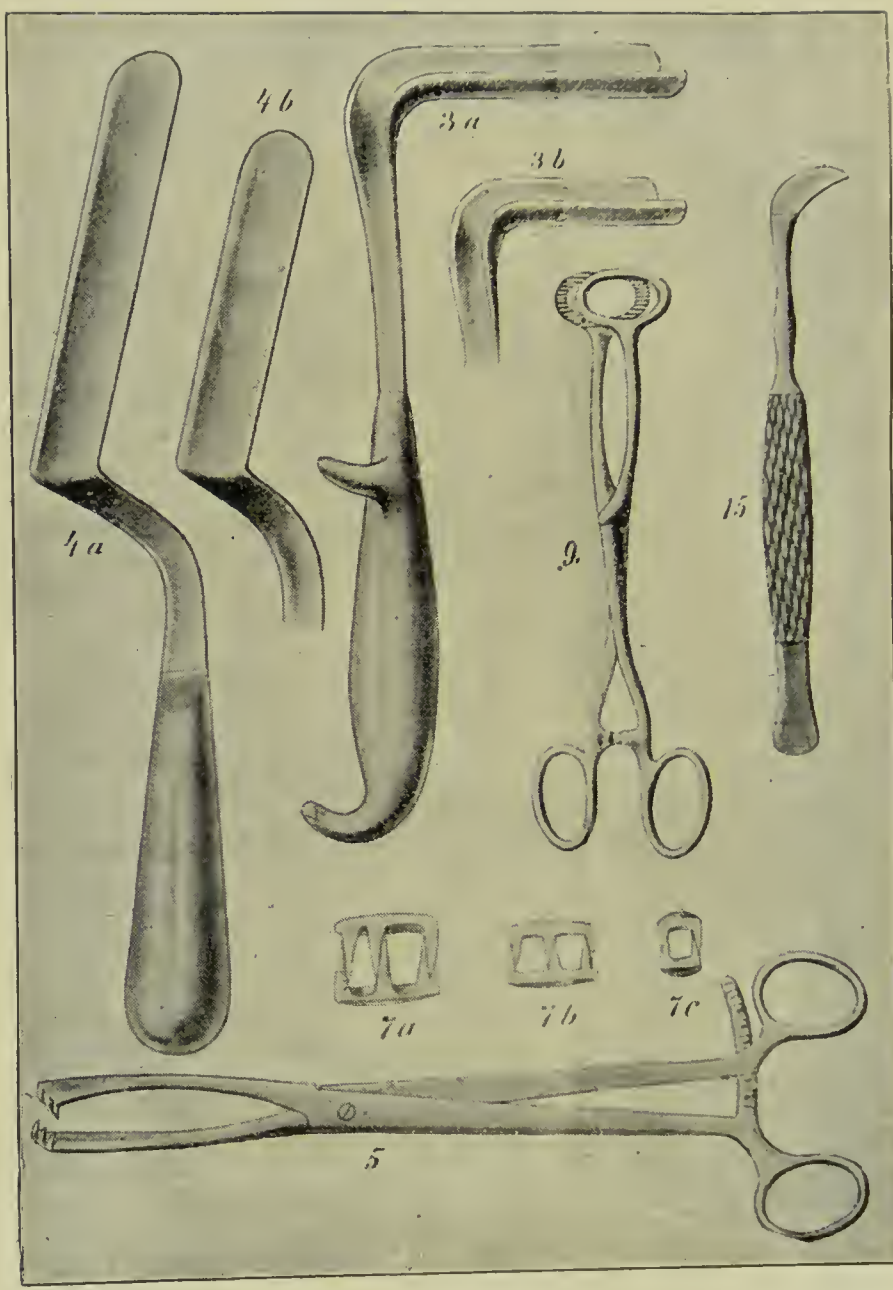


PLATE V.

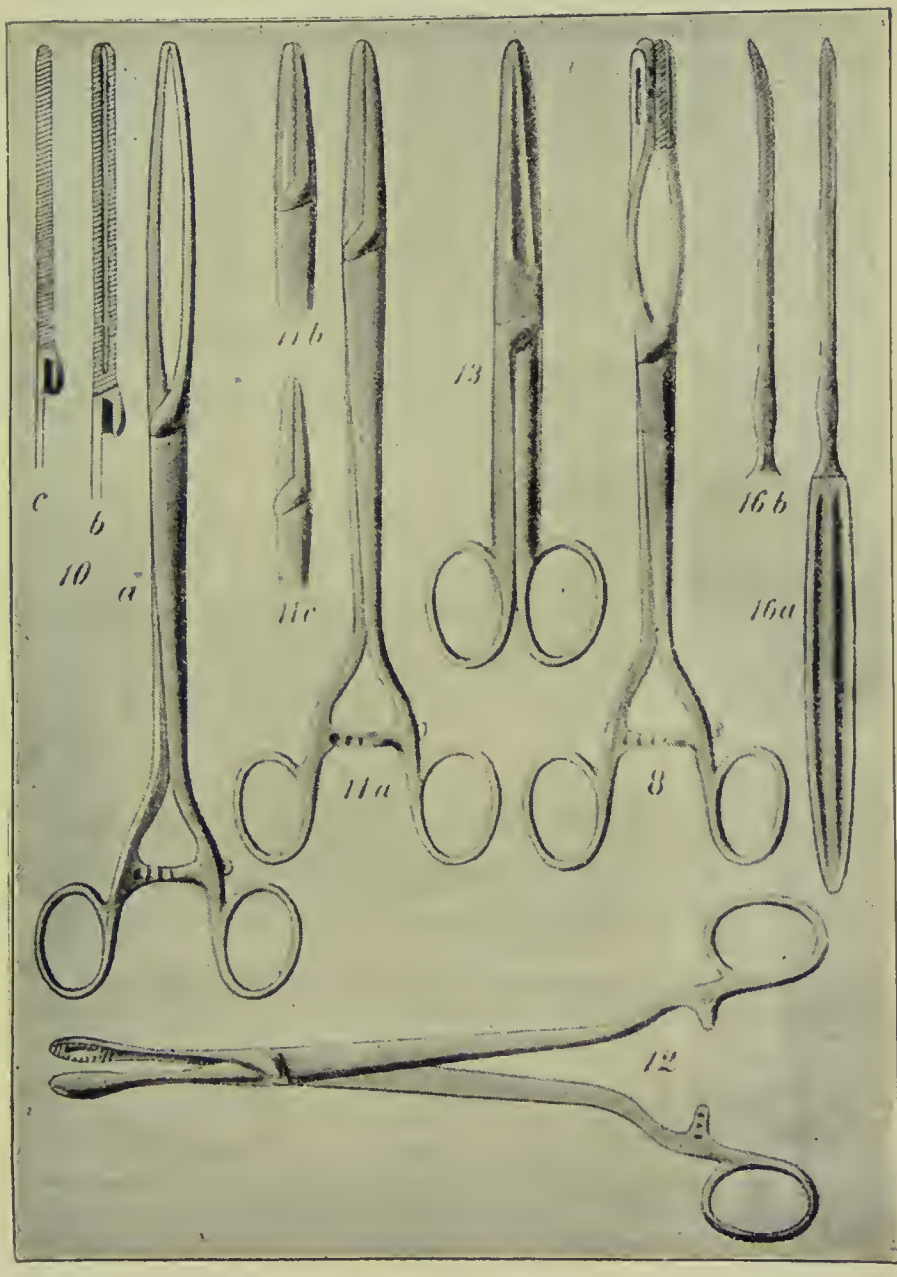
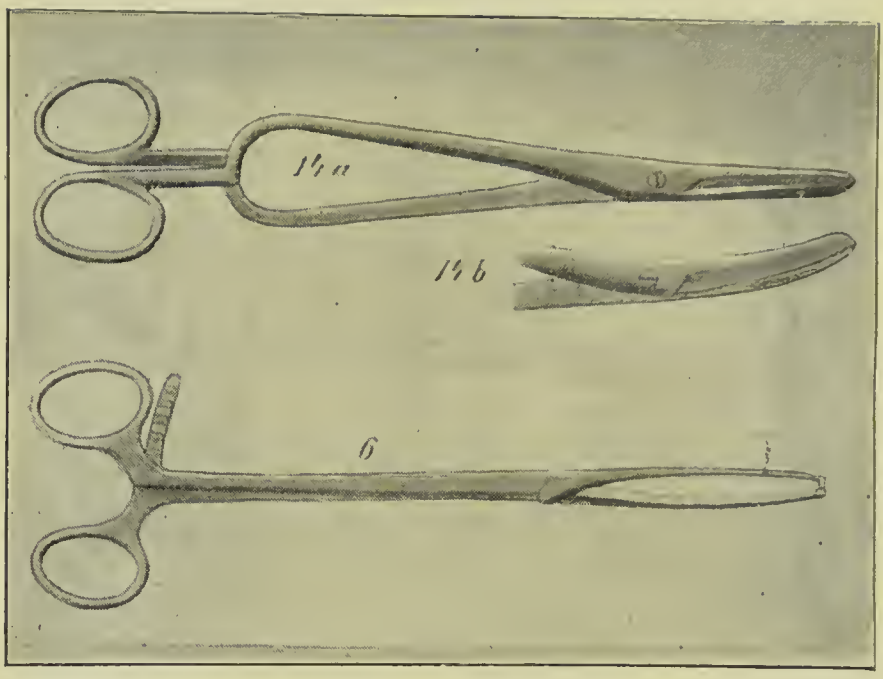


PLATE VI.



DESCRIPTION OF PLATES.

PLATE IV.

FIGS. 4 *a*, 4 *b*, 3 *a*, 3 *b*.—Vaginal Retractors.
FIG. 9.—Ovary Forceps (Doyen).
FIG. 15.—Sickle-shaped Knife, with Raspatory handle (Breunecke).
FIGS. 5, 7 *a*, 7 *b*, 7 *c*.—Claw Forceps.

PLATE V.

FIGS. 10 *a*, 10 *b*, 10 *c*, 11 *a*, 11 *b*, 11 *c*.—Broad Ligament Clamp (Doyen, Péan, Segond).
FIGS. 8-12.—Serrated Forceps for seizing (Segond and Doyen).
FIGS. 16 *a*, 16 *b*.—Knife, with hollowed Blade, for Morcellement (Landau).

PLATE VI.

FIGS. 14 *a*, 14 *b*.—Long Scissors (straight and curved) for dividing the Uterus in Hysterectomy (Landau).
FIG. 6.—Slender-toothed Forceps (Doyen).

NOTE ON PLATES IV., V., VI.

The retractors and other appliances shown in Plates III., IV., V., are from recent models. They are grouped together for convenient reference. The instruments shown in Plates IV., V., and VI. are those used by Professor Landau in his operation of vaginal pan-hysterectomy by the clamp method.

Briefly, Professor Landau's operation consists of the following steps :

Thorough asepsis is first secured in the usual manner. The woman is in the dorsal position, and the uterus, having been exposed with suitable retractors, is seized with strong claw forceps at either side. A circular incision, made with a scissors, is carried round the neck, a little higher posteriorly than anteriorly. The bladder having been carefully separated by scissors and finger, and the ureters kept out of danger, the peritoneum is cautiously opened in front, and is protected by a straight écarteur, the bladder and the ureters being thus lifted out of the field of operation, and protected from injury. The posterior incision having been deepened, and the cul-de-sac of Douglas opened, the uterus is next, by means of heavy claw forceps applied at either side, drawn through the anterior incision. The tubes and ovaries are now enucleated, and any abscess débris evacuated. The broad ligaments are then clamped at either side—either from below upwards, or from above downwards—with a pair of Doyen's strong clamp forceps, supported by a slender pair of the same, and the uterus is next resected in the usual manner. It may be necessary to apply more clamp forceps in exceptional cases, and it is well to have a large variety of these at hand. In some cases where the uterus is large, or is fixed by adhesions and old inflammatory effects, Professor Landau divides the uterus with a scissors, and carries the section from the anterior down the posterior wall, thus gaining greater power over either half of the fundus, the hæmorrhage being restrained by the application of claw forceps. The vagina is next dressed with three strips of sterilised gauze

carried on into the cavity slightly beyond the ends of the clamps. These are not removed for forty-eight hours. In other cases Landau practises complete *morcellement* of the affected uterus. The first step in this operation (after the preliminary freeing of the bladder, etc.) is the section of the uterus. The strong traction of the uterine segments exerted by the claw forceps restrains hæmorrhage. The broad ligaments are readily secured. The uterus may have to be brought away piece by piece with Landau's curved knife or special scissors. This latter morcellation is necessary in some cases of malignant disease, uterine fibroids, and extensive adhesions. Thus, in Landau's operation, no ligatures are used from first to last.

I have not myself operated by this method, but I have quite lately seen Professor Landau operate on several occasions. His results are excellent.—See a more detailed account of the operation by the author in the *British Gynæcological Journal*, February, 1897; also 'Vaginal Radical Operation,' *Technik und Geschichte*, Professor L. and Dr. T. Landau, Berlin, 1896, Verlag von August Hirschwald, unter den Linden, 68. See the same journal for description by the author of Professor A. Martin's operation of colpotomy and vaginal fixation.

LEEDS & WEST RIDING
MEDICO-CHIRURGICAL SOCIETY

CHAPTER XXX.

AFFECTIONS OF THE FALLOPIAN TUBES.

Congenital abnormalities.

Salpingitis (acute and chronic) { Catarrhal. / Interstitial. / Suppurative. / Tubercular. / Gonorrhœal.

Stricture.

Hydro-salpinx, Hæmato-salpinx, Pyo-salpinx } These three affections are regarded as the consequences of salpingitis.

Adhesions and displacements.

Papilloma—Carcinoma.*

Tubal pregnancy.

I do not propose to delay to discuss at great length certain questions connected with abnormal states of the Fallopian tubes, which have rather a pathological than a clinical interest attached to them. The names of Battey and Lawson Tait are linked with many of our modern views of the consequences of Fallopian disease, and the causes of the suffering attendant upon morbid states of the tubes and associated ovarian diseases. It will be widely acknowledged by all unprejudiced persons that Tait established the important part played by the Fallopian tubes in perpetuating those chronic pelvic troubles which removal of the ovaries alone could not relieve.

* Primary carcinoma of the tubes is exceedingly rare. See p. 514, case of Mary Dixon Jones.

FIG. 398.—Chronic Hypertrophic Salpingitis (×35 diameters). A, false membranes; B, B, line of surgical section, corresponding to the middle of the broad ligament; C, fibrous bed strewn with muscular fasciculi; D, thickened bed of soft fibres, mostly circular; E, mucous membrane; *g*, *g*, pseudo glands of cylindrical epithelium, due to the welding together of the villous structure; *ml*, longitudinal fibres.

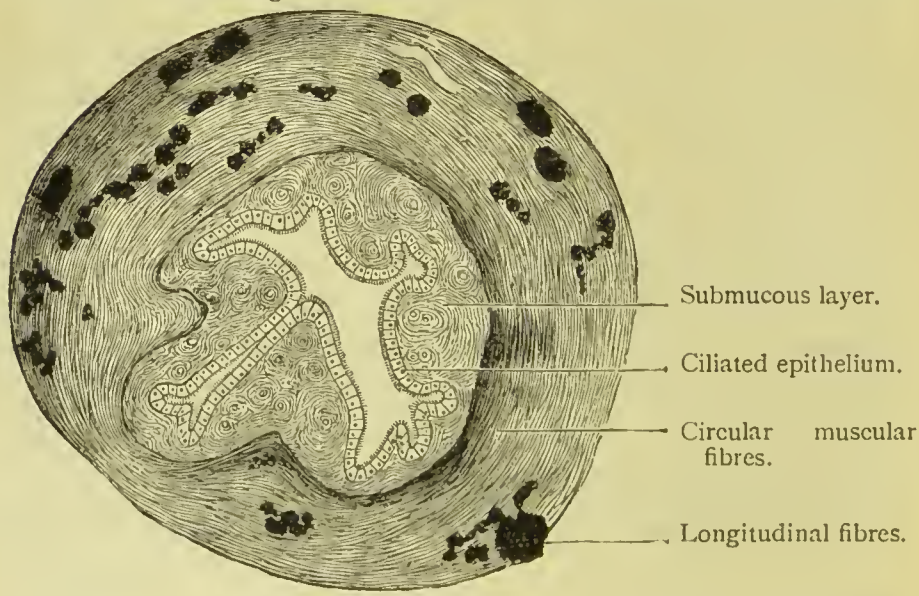


FIG. 399.—Normal Fallopian Tube in section (×10 diameters). Macalister.

Structure of Walls of Fallopian Tubes.

Mary Dixon Jones describes the structure of the tubal walls as consisting of:

(*a*) Six layers of smooth muscles, the principal two of which, interlaced, are circular and longitudinal, the latter being external.

(*b*) Myxomatous connective tissue constitutes the inner surface of the tubal wall, and here also we find an interlacing longitudinal and circular muscle layer. The folds in the mucosa are produced by contractions and elongations of these latter muscle layers, serving to occlude the tube during life.

(*c*) A plexus of bloodvessels, arterial and venous, is found outside the longitudinal layer of the wall.

(*d*) There are also two narrow layers of oblique smooth muscle fibres, traceable from the uterine ostium to the fimbriated extremity, corresponding to the two oblique layers of the uterine parietes. These layers regulate the blood current in the subjacent arteries and veins.

Bland Sutton (*lib. cit.*) thus refers to the changes produced by salpingitis:

'When a healthy Fallopian tube is examined in transverse section by means of a microscope, we distinguish easily the serous and muscular coats of the tube, and, standing upon these, the so-called plicæ formed by the mucous coat. Each plica consists of a delicate framework of connective tissue, fringed with columnar ciliated epithelium on the free surface. Delicate strands of unstriated muscle-cells may be distinguished near the base of the epithelium, and in the middle of the fold are many capillaries. As a rule, a few leucocytes may be seen scattered among the meshes of the connective tissue. When sections are prepared from tubes which have been for some months past the seat of salpingitis, the appearances are very different. The plicæ are swollen to twice or thrice the usual size, and all the details of their structure obscured by an innumerable host of cells of various sizes. In many places the limiting epithelium is lost, in others it can be detected, disturbed, and disarranged, here and there seemingly held in position by some glutinous material. In mild cases this peculiar cell infiltration is limited, and does not involve the whole plica, but in very diseased specimens the cells are not limited to the plicæ, but involve the muscular coat, and extend into the connective tissue of the meso-salpinx.'

Salpingitis.

Diagnosis.—Salpingitis is a much more common affection than is generally thought, especially during the childbearing period of a woman's life. To detect a swollen or thickened Fallopian tube, we examine the patient in the same position and manner as is described in the case of the ovary. We can

most frequently trace it from the lateral margin of the uterus outwards, and feel its more prominent portion behind the uterus and towards Douglas's pouch.

By a careful digital examination, we may detect effusions, thickening, enlargement, an adhesion, or a tumour. Such diagnosis requires experience in gynæcological examination. Tait's view, as strongly urged by him, is that, in a great number of cases, *no step save an exploratory abdominal section enables the surgeon to discover the nature of the disease.*

Exploratory Abdominal Incision.

No more concise directions for the precautions to be taken in making an abdominal exploratory incision can be laid down than those of Stainsbury Sutton (*Jour. of the Amer. Med. Ass.*, Jan., 1887). They are as follows :

1. Perfect cleanliness of the patient's abdomen.
2. Perfect cleanliness on the part of the operator.
3. Perfect cleanliness of the instruments.
4. Thorough anæsthetization of the patient.
5. The incision is to be small, and all bleeding must be arrested before the peritoneum is opened.
6. Careful opening of the peritoneum ; the passage of two fingers for purposes of exploration, if necessary ; for further searching of the abdomen, enlarge the wound in an upward direction, and search again.
7. The operator alone is to put his hand into the abdominal cavity.
8. Make a careful peritoneal toilet ; if necessary, flush out with warm water, and sponge this all out. Pass the sutures over a flat sponge laid beneath the wound.
9. Do not use carbolic acid or sublimate solutions, save as a means of disinfecting the operator's hands.
10. Dry the lips of the wound with iodoform gauze.

To this we would add, use dry salicylic or boric absorbent wool as the external dressing of the wound ; avoid opiates, if

possible ; if sleep be required, give thirty grains of sulphonal or chloralamid. Bromide of potassium does not secure it.

Owing to adhesions, a diseased Fallopian tube may be carried in front of, or over, the fundus uteri. Fixation of the pelvic contents, and the presence of the characteristic sausage-like mass at the side of the uterus, are the prominent physical signs. The various forms of inflammation may cause closure of the uterine or fimbriated end, more frequently of the latter. On the other hand, the inflammatory changes may lead to a permanently enlarged and open state of either orifice. Such variations in the size of the orifices, and their relative degrees of patency, will depend on the nature of the inflammatory process and the character of the intra-tubal secretion. Often, in simple catarrhal affections, this patent state of the uterine orifice appears to be of an intermittent nature. The serous contents of the tube may then empty themselves at intervals into the uterus, assisted by the muscular contraction of the tubal wall.

Classification.—Petit divides the various forms of salpingitis, by their anatomical and clinical differences, thus :*

- Non-cystic salpingitis
  - Acute
    - Of mucous origin.
    - Of lymphangitic origin (very rare).
  - Chronic
    - Mucous or catarrhal endo-salpingitis.
    - Parenchymatous
      - Hypertrophic
      - and
      - Atrophic.
- Cystic salpingitis
  - Hæmato-salpinx.
  - Hydro-salpinx.
  - Pyo-salpinx.

* 'Traité Pratique de Gynæcologie,' p. 221, par Stephan Bonnet et Paul Petit.

Pozzi prefers the following classification :

- Acute non-cystic salpingitis
  - Catarrhal.
  - Purulent.
- Chronic non-cystic salpingitis
  - Parenchymatous
    - Hypertrophic.
    - Atrophic.
- Cystic salpingitis
  - Hydro-salpinx—serous.
  - Hæmato-salpinx—sanguineous.
  - Pyo-salpinx—purulent.

Martin describes but two distinct forms of salpingitis—(1) Interstitial endo-salpingitis; (2) follicular endo-salpingitis. There is a degeneration and destruction of the epithelium and muscular elements; the lumen of the tube becomes occluded in one part and extended in another; and, finally, suppuration takes place.

The Bacteriology of Salpingitis.—Bland Sutton says :

'Investigations on the micro-organisms present in infected and pus-containing tubes have been carried out in many instances. In a large proportion of cases the fluids contained in chronically inflamed and dilated tubes were *sterile*. In a fair proportion the gonococcus was present, occasionally alone, but frequently associated with the streptococcus, and the staphylococcus, more rarely the pneumococcus, and the bacterium coli commune, have been detected.

'The characters of the micro-organisms in a distended Fallopian tube very largely influence the course of a case. For example, a pyo-salpinx in which the pus is sterile, or contains non-pathogenic organisms, may leak into the belly, and give rise to troubles merely local; but if it contain streptococci, staphylococci, or bacterium coli commune, the result would be fatal. The same applies to pus-contamination of the peritoneum in the course of oöphorectomy, etc.'*

ÆTIOLOGY.

There can be no doubt that we must look to the uterus for the source of the great majority of inflammations of the tubes and ovaries. The infection may travel through the lymphatics or the bloodvessels. But it probably oftener finds its way by direct continuity through the mucous membrane. Endometritis, whether of a catarrhal or specific (gonorrhœal) nature,

* *Lib. cit.*

is frequently the cause. Out of 987 autopsies recorded by Galabin, Lemiere, and Winckel, in 211 there was found some affection of the annexa. The inflammation may travel, doubtless, from the tube to the uterus, but the reverse is generally the case. The microbal test cannot here be always relied on, as the gonococcus of Neisser has not been found in some cases where the character of the salpingitis was beyond a doubt. The ovary participates generally in the inflammation in any case of severe salpingitis. Salpingitis frequently accompanies uterine inflammation, acute and chronic; also peritoneal and cellular pelvic inflammations. Hence it commonly follows the exciting causes which predispose to these affections It may also attend on a zymotic disease.

As bearing out these observations in the text, I quote the remarks of Bland Sutton on

Gonorrhœal Endometritis.—'Although the most serious sequelæ of gonorrhœa in women are connected with the Fallopian tubes and ovaries, it is necessary to emphasize the fact that grave chronic changes also occur in connection with the uterus. Patients occasionally come under observation presenting typical symptoms of chronic gonorrhœal salpingitis, and on examination with the speculum, an acrid, purulent discharge is seen issuing from the uterus and excoriating the vagina. It might be supposed that this purulent material escapes from the Fallopian tubes into the cavity of the uterus, were it not for the fact that the discharge sometimes continues after removal of the tubes and ovaries. My attention was first seriously directed to this matter in consequence of patients, from whom I had removed pus-containing Fallopian tubes secondary to gonorrhœa, complaining of the inconvenience and suffering caused by the acrid discharge. In some of these cases I have found it necessary, after exhausting other means, to perform vaginal hysterectomy.

I have already referred to the occasional passage of the uterine sound into the tube in *dilated* or *saccular* states, and this fact also has an important bearing on intra-uterine medication, and the bad results which may attend on it. The opposite condition, or the one of *stricture* of the tube, is a well-understood cause of sterility. Stricture or closure of the tube may produce in it distension and accumulation of fluids, and mucus, pus, or blood, may collect.

Distension may lead to retro-flow of the fluid or *rupture* of the tube. *Adhesions*, *displacements*, *cystic* enlargements, are

also some of the remote results of inflammation, either primary or secondary, of the tubes. An unusually large accumulation of fluid is termed *tubal dropsy*. The possibility, however, of hæmato-salpinx arising at any time during the growth of the ovum in tubal pregnancy must not be lost sight of.

Alban Doran* has entered fully into the effects of closure of the ostium of the Fallopian tube by perimetritis or salpingitis. He showed that 'in adhesive perimetritis the fimbriæ of the

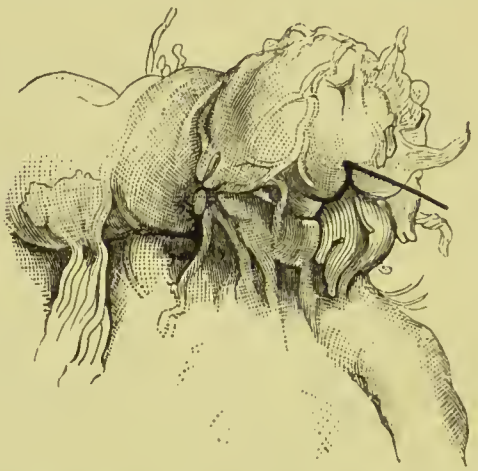


FIG. 400.—Complete obstruction of the Ostium, the result of Salpingitis. The end of the tube has been detached from the ovary below and the ostium forcibly opened ; a bristle passes out of its orifice. The tissues of the tube have swollen over the ostium, completely concealing the fimbriæ, excepting the ovarian fimbriæ, which are seen below the bristle. Behind and above the bristle are perimetritic bands, which must not be mistaken for fimbriæ. (Alban Doran.)

tube are bound down by bands, which thus obstruct the ostium. In salpingitis, the ostium is obstructed, incompletely at first, by the swelling of the mucous membrane which involves the fimbriæ, but permanently in bad cases by great infiltration of the submucous tissue and middle coat, which swell over the ostium and cover in the fimbriæ.'

Doran drew attention to the 'crumpling up' of the meso-salpinx by inflammatory adhesions, and the consequent approximation of a distended tube to the ovary. 'Salpingitis,' he

* 'Transactions Obstet. Soc.,' vol. xxxi., 1889.

says, 'with obstruction, brings the tube and ovary into more intimate relations. The distended tube opens up the layers of the meso-salpinx until its walls touch the ovary, just as a burrowing ovarian cyst opens up the same serous layers until its walls touch the tube. A broad ligament cyst burrows in the same manner till it touches the tube above and the ovary below. This process, which may be termed the burrowing of the tube, can be readily demonstrated on an ordinary hydrosalpinx. Monprofit, who has described the process with great accuracy, terms it *le dédoublement du méso-salpinx*. The reason that the ostium is more or less permanently closed is easily

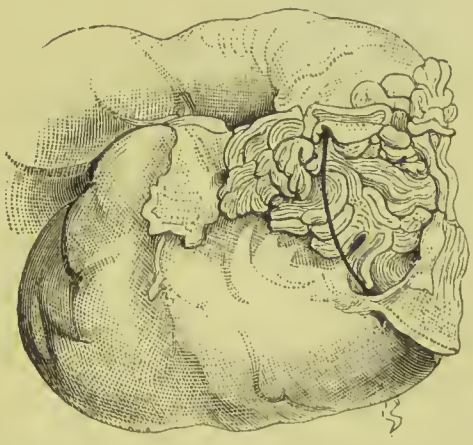


FIG. 401.—An Ovary and Tube, showing obstruction of the Ostium by perimetritic deposit, which forms a deep pouch. The fimbriæ have been partly pulled out of the pouch. A bristle passes into the pouch out of the ostium. (Alban Doran.)

explained. It is occluded either by bands of lymph which cover in the fimbriæ, or by changes within the walls of the tube, which cause much swelling, so that they bulge and close in over the fimbriæ. The first process is essentially a part of the pathological changes constituting perimetritis. I shall therefore term it, for the sake of simplicity, "perimetritic closure of the ostium." The second process is a part of the condition known as salpingitis, and may be termed "salpingitic closure of the ostium." As perimetritis and salpingitis are often combined, both generally take a share in closing the ostium.'

'Perimetritic closure is the simpler form. A little deposit covering the delicate fimbriæ as they lie on the surface of the outer aspect of the ovary is sufficient to bind them down, and then the ostium necessarily becomes closed as soon as the deposit is organized. In operations for chronic disease of the appendages the early stage of the process is often observed. Sometimes, on scraping away the bands of lymph, the fimbriæ come in sight, well formed, succulent, and bright red, being full of blood. In that case little or no salpingitis is present.'

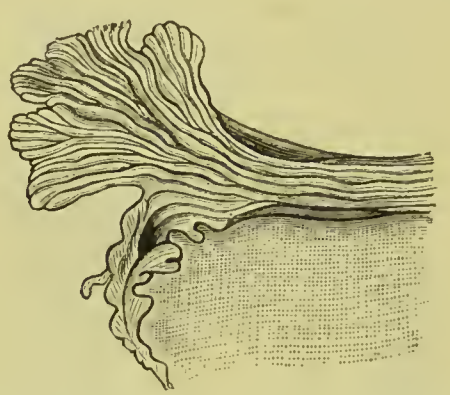


FIG. 402.—Ostium of normal Fallopian Tube laid open, showing the continuation of plicæ into fimbriæ, and the dichotonous division of the fimbriæ. The ovarian fimbriæ are well formed.

Doran approves of the principle of the operation of salpingostomy under certain conditions.* The object is to restore the tube to its function before it is lost. It does not follow because pain is absent, even after an operation in which a tube is inspected and returned, no disease being detected at that time, that the ostium may not be closed, and thus future obstruction may result.

Relation of Salpingitis to Perimetritis.

I have already, in discussing the etiology of parametritis and perimetritis, referred to the various other causes that may lead up to a combined inflammation of both ovaries and tube. In fact, *the more we know of the pathology of perimetric inflamma-*

* See p. 585.

tion generally, the more obvious is it that these four affections—metritis, perimetritis, salpingitis, and ovaritis—are often correlated and consequent on each other, and that all four are frequently associated and concurrent. Endometritis leads to catarrhal salpingitis, which in its turn is the precursor of hydro salpinx or pyo-salpinx. The ovary is next involved, and probably becomes adherent, and a communication takes place between the parenchyma of the latter and the suppurating tubal cavity. It is rare to find the case of isolated salpingitis or ovaritis without some correlative inflammatory condition of either tube, ovary, or uterus. Hence there is much reason in Pozzi's division of *oöphoro-salpingitis*, which includes inflammation of the ovaries and Fallopian tubes; *cystic oöphoro-salpingitis*, including hydro-salpinx, hæmato-salpinx, and pyo-salpinx, as well as *cystic ovaritis*, whether of the serous, sanguineous, purulent, or lymphatic type. Also the term *perimetric salpingitis* is made by this author to include perimetritis with phlegmon of the broad ligaments, cellulitis, and pelvic abscess, of which I have already spoken.

General Deductions.—From all that has been observed and written on this subject I repeat that the great practical lessons we learn are: *Firstly, that, as chronic uterine inflammatory states are the frequent forerunners of inflammation of the annexa, it is a grave error to trifle with these, and go on with expectant measures for an indefinite time in cases of endometritis of any form; secondly, that morbid conditions of the Fallopian tubes and ovaries are more frequently present than absent in perimetritis and peri-uterine phlegmon; thirdly, that all experience teaches us that the postponement of active methods of treatment—by waiting on nature and trusting to such means of cure as prolonged rest, hot douching, tampons, intra-uterine medication, or aspiration—is only putting off the time when, under much more unfavourable circumstances, operation of one kind or the other has to be resorted to.*

Pathology.*

Acute salpingitis, arising in the tubal mucous membrane, may pass into a chronic state, or, the cause being of an infective nature, such as gonorrhœal or puerperal inflammation, the entire thickness of the tubal wall is quickly involved, including the connective intermuscular tissue, which becomes œdematous. Possibly a miliary abscess forms (Boldt), and finally pyosalpinx, or it may end in contraction and sclerosis. The epithelial lining may be preserved, while the wall of the tube is thus thickened.

Endo-salpingitis.

In *endo-salpingitis* the main brunt of the attack falls on the mucous lining. This is a true catarrhal state, and may lead to suppuration. Gradually in shape and size the tube is altered, and its calibre is obstructed. The secretion it contains may be mucous or pus. Such naked eye appearances are attended by corresponding changes in the microscopical features of the tissues. The mucous folds, thickened and reduplicated, are in parts united by exudation. The epithelial elements are disposed in irregular masses around the depressions. In the simple catarrhal state the epithelial cells and their nuclei are swollen. The mucous chorion is œdematous, and infiltrated with white blood-cells; the vessels are dilated and engorged. And the same conditions prevail in the purulent variety, save that there is a more active diapedesis, and the epithelial elements are separated by the transuding blood-cells.

Parenchymatous Salpingitis.

In *parenchymatous salpingitis*, which may be secondary to the acute endo-salpingitis, the lumen of the tube is encroached on; the wall becomes harder. Its fimbriated end is changed in its appearance. The advancing sclerosis gives to the mucous surface a smooth feel and look. The result is a

Lib. cit. (Bonnet and Petit).

chronic hypertrophic condition, in which pseudo-membranous lamina of tissue are formed, and fibrous layers are scattered between the normal muscular fibres. These contract the lumen of the canal, which is still further narrowed by the thickened villi, clothed with elongated cylindrical epithelium.

Chronic Atrophic Salpingitis.

In the final stage of this sclerotic change, we arrive at that form of connective-tissue development that obliterates the muscular tissue and the vessels, and greatly reduces the lumen of the tube or obliterates it altogether. This atresic state is preceded by an atrophy of the cilia, and is the last stage of the chronic atrophic degeneration so well described by Bonnet and Petit.

Tait draws a distinction between the salpingitis that mainly affects the mucous lining (endo-salpingitis) and that which attacks the substance (parenchymatous) of the tubes. The latter is by far the more common. As a result we have severe dysmenorrhœa before and during a period; at times there is a history of gonorrhœal inflammation, a miscarriage, or a zymotic fever.

There is frequently extreme dyspareunia. I have had several such cases, one occurring in the person of a young lady in whom most severe vaginitis and metritis were induced by the forcible introduction under chloroform of a large ring pessary, which unfortunately was permitted to remain in until it had to be removed under an anæsthetic.

The sphincter-like action of the muscular fibres surrounding the uterine openings of the tube has to be remembered. Arrest or destruction of the function of these fibres has an important bearing on the entrance of fluids into the peritoneal cavity, and on the danger of intra-uterine medication. We can readily understand how the sphincter action is arrested in severe post-partum hæmorrhage, and destroyed in diseased conditions of the endometrium, or from the growth of tumours in the adjacent muscular structure.

Accessory Ostia and Cysts of Meso-metrium.

I recently showed this specimen at the Gynæcological Society, of which the following is the pathological report by Dr. Taggert.

Right Uterine Appendages.—The Fallopian tube, its ostium and fimbriæ, were normal. Attached to the posterior surface of the meso-salpinx were two pedunculated bodies nearly half an inch long. The extremity of one of these bodies was dilated into a small cyst, so that it resembled a hydatid of Morgagni. The other body had a stouter pedicle, became

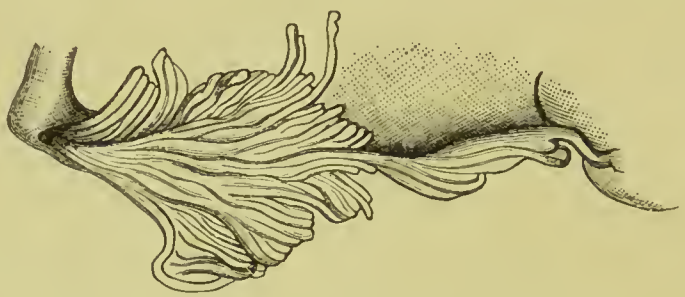


FIG. 403.—End of normal Fallopian Tube with Ostium laid open. The plicæ are prolonged, as in Fig. 402, and continued to the end of the ovarian fimbriæ. The plicæ are, as Richard long ago demonstrated, elevated and ineffaceable folds of mucous membrane, like the valvulæ conniventes, excepting that they run in the long, not the short, axis of the canal in which they lie. As they pass beyond the ostium they become larger and multiply; sometimes two fimbriæ formed by division unite again. (Alban Doran.)

dilated towards its free extremity, and terminated in a minute ostium and fimbriæ. A bristle could be inserted into the ostium for about an eighth of an inch. The body had, therefore, the structure of an accessory Fallopian tube. The seats of attachment of these pedunculated bodies were very close together, and corresponded in position with the horizontal tubules of the parovarium; their development was probably associated with these tubules, and the fimbriated body might be regarded as the persistent end of the Wolffian duct. The ovary showed much wrinkling of its surfaces at the upper pole,

but the rest of the exterior was smooth and healthy. On section, an oval thick-walled cyst was displayed, which measured an inch in chief diameter. It contained a little blood-stained fluid, but had ruptured during removal, hence the greater part was lost.

Left Uterine Appendages.—The Fallopian tube and its fimbriæ were healthy; there were three distinct ostia leading out of the ampulla. The fimbriæ on the edge of the meso-

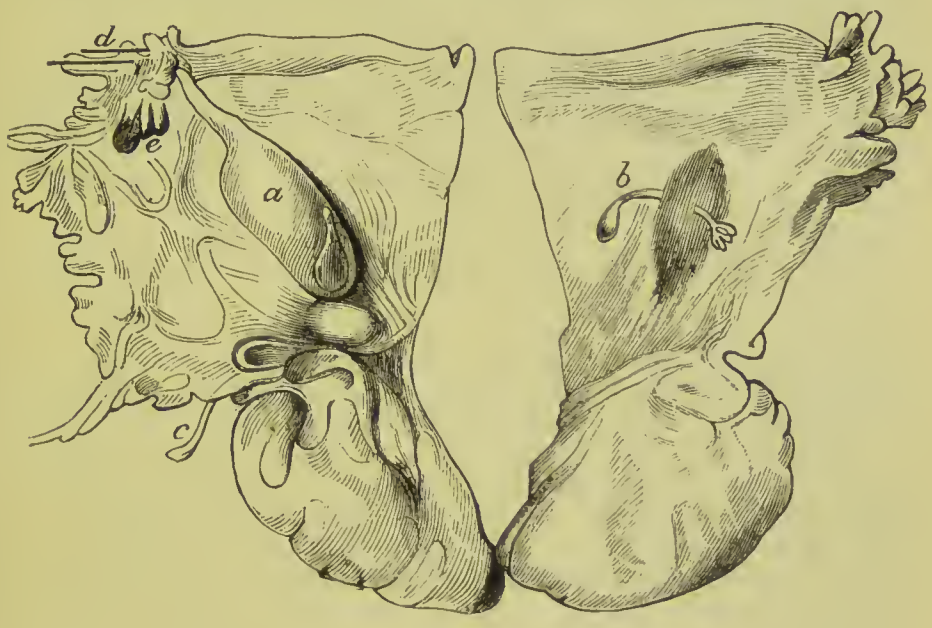


FIG. 404.—Ovaries; meso-metria and Fallopian tubes viewed from behind. (*b*) Right meso-salpinx showing pedunculated cyst resembling hydatid of Morgagni (persistent end of Wolffian duct); accessory Fallopian tube (cyst in ovary not seen on the anterior surface); (*d*) three distinct ostia of left Fallopian tube; (*a*) cyst with pedunculated cyst springing from it, similar to that at the right side; three other small cysts are in this meso-salpinx (*vide* text), one (*c*) pedunculated.

salpinx were numerous, but appeared healthy. Between the layers of the meso-salpinx there were four small cysts. The largest had an elongated outline, its long diameter measured nearly one inch, and was placed almost at right angles with the axis of the Fallopian tube. From the surface of this cyst sprang a small pedunculated cyst like a hydatid of Morgagni,

and this resembled the structure described in the right appendages. The remaining two cysts in the meso-salpinx were the size of a pea; they did not seem to be connected with the vertical tubules of the parovarium, one being close on the edge of the meso-salpinx, and the other crossed by these tubules. But with regard to the elongated cyst, the abdominal end of the horizontal tubules might be traced up to it. Hence it could have arisen in connection with the extremity of the Wolffian duct.

The naked eye appearance of the left ovary did not differ materially from that of the right. Its surface was less wrinkled, and on section a similar cyst was to be seen at one end of the organ. This had ruptured during removal. There was another small cyst in the substance of the ovary.

With regard to these hydatids or cysts of Morgagni, Bland Sutton says:

'This term is applied to a small-stalked cyst attached to the fimbriæ, and in some instances to the tube itself. It is rarely larger than a pea. Sometimes it is represented by a tuft of fimbriæ supported on a long pedicle. Occasionally the pedicle of the cyst is furnished with a small tuft of fimbriæ. The true hydatid must not be confounded with stalked cysts, so frequently found associated with the parovarium. Ballantyne and Williams have carefully investigated the frequency with which the true "hydatid" is present. They found stalked cysts present in 75 per cent. of specimens examined. The true Morgagnian cyst was present in 8 per cent. in adults, and in 27 per cent. of fœtuses and infants. The total number of tubes examined was ninety-four pairs from adults, eleven pairs from fœtuses, and five pairs from children. There are structural differences between the two forms. According to Ballantyne and Williams, the true Morgagnian cyst "is lined by a mucosa with simple folds, covered by a single layer of ciliated columnar epithelial cells; its wall is always composed of muscular fibres, arranged circularly and longitudinally; its outer membrane is the peritoneum; its stalk is always muscular, and its contents consist of clear limpid fluid; whereas, the small pedunculated cysts of the parovarium have fibrous stalks and walls; the inner walls of such cysts are lined by cubical epithelium." With regard to the *pedunculated accessory fimbriæ*,' the same author says, 'they are probably derived from Kobelt's tubes. When describing the parovarium, attention was drawn to the pedunculated cysts so frequently found at its outer end, known as Kobelt's tubes. Some of these small cysts rupture, and, instead of a stalked cyst, we find a pedunculated tuft of fimbriæ. The cysts sometimes appear as if growing from the wall of the tube, and I have little doubt that the stalked tufts of accessory fimbriæ originate in similarly displaced Kobelt's tubes.'

Hydro-salpinx.—This distension of the Fallopian tube with serum must be kept distinct from those thickened conditions I have referred to, in which temporary collections of fluid occur in the sacculated tube, or when an ovarian cyst communicates with the tube of a tubo-ovarian cyst. The latter condition reaches far greater dimensions than does a hydro-salpinx, and hence the confusion which has arisen as regards the occasional size to which a hydro-salpinx may extend. The probability is that every case of hydro-salpinx is the sequel of a salpingitis which is arrested in the serous stage of the inflammation, and does not pass beyond it into a pyo-salpinx. The average size of a hydro-salpinx is about that of a medium-sized egg or pear. It is ovoid in shape, and smooth; its walls are thin and almost transparent in parts. The fluid is clear or pale yellow in colour. Floriep has divided hydro-salpinx into two varieties, according as the internal orifice of the tube is closed or open. Tait attributes the cystic tendency in the Fallopian tubes in many cases to an arrest of development of the oviduct, which is in part obliterated.

Hæmato-salpinx.—As in the instance of the serous cystic distension, so hæmato-salpinx is to be regarded as a true cystic distension of the Fallopian tube with blood. It is not a mere transitory effusion which escapes or is absorbed, and it should, strictly speaking, be kept quite distinct from the blood which escapes in a ruptured tubal pregnancy, though still to the latter some authors apply this term. Nor is the possible detention of blood in the tube (the consequence of a congenital atresia of the vagina or uterus) to be confounded with true hæmato-salpinx. Pozzi divides hæmato-salpinx into two principal forms, according to their etiology.

Tubal Apoplexy.—The first he attributes to an *apoplexy of the tube*, following upon catarrhal congestion, or on menstrual suppression and irregularities. These are those more temporary swellings which occur in previously thickened and altered tubes. They are generally reabsorbed after a short time, leaving the tube in its original changed condition. The

sanguineous effusion may occur from the mucous lining of the tube. This has been many times insisted on by Tait. Thus, the tube, when fixed in the pedicle in the abdominal wall after ovariotomy, has been seen to bleed during the time of a menstrual period. Pressure from uterine myomata or intra-ligamentary tumours may also cause bleeding into the tubal cavity, and this may assume the cystic form.

Hæmato-cystic Hæmorrhage.—The second variety described by Pozzi is characterized by the presence of a sac. This sac

FIG. 405.—Hydro-salpinx with Cystic Ovary attached (after oöphorectomy in a case in which a large cystoma of the left ovary was removed). (Macnaughton-Jones.)

he looks on as a tubal pregnancy arrested in its development, followed by the death of the embryo, which is reabsorbed; or it may be that there has been a pyo-salpinx which has obliterated the outer orifice of the tube, and in this pathological cavity, incapable of reabsorption, the blood is effused. At times Pozzi says this transition may be direct from a pyo-salpinx to a hæmato-salpinx, or there may be an intermediate stage in which, after hydro-salpinx, the sanguineous effusion

occurs. The sac may vary in thickness in different parts, and the fluid differs in consistence, dependent upon the cause of the effusion. The mucous lining is generally thickened, and its surface in parts is crowded with engorged capillaries, the fusiform cells covering which are devoid of epithelium (*lib. cit.*).

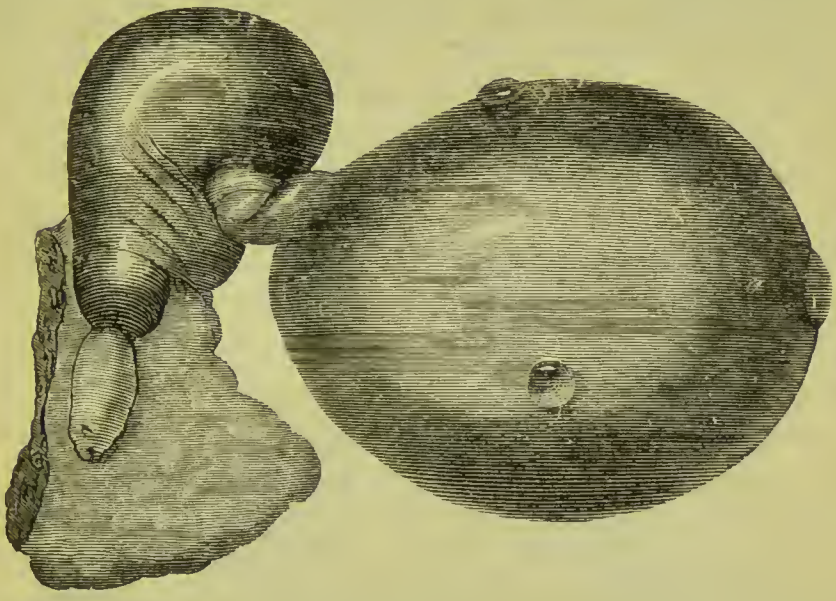


FIG. 406.—Infarcted Hydatid to right, with Constricted Pedicle at its left extremity. Infarcted Fallopian tube above to left; ovary, with normal uterine end of tube overlying it, to left below this. (The drawing three-fourths natural size.)

Twisted Fallopian Tube and Infarcted Hydatid.

W. W. Russell, of John Hopkins' Hospital, has published an interesting case (*Amer. Jour. of Obs.*, vol. xxx., 1894) of hæmorrhagic infaretion of the Fallopian tube due to (1) a cystic formation in the tube; (2) distortion from adhesions and rotation of the pedicle of the cyst. Cœliotomy was performed by Howard Kelly, after a suecession of attacks of abdominal pain and vomiting. At both sides the ovaries were adherent to the pelvic wall. The right Fallopian tube was turned upon itself, so that the ampulla rested against the posterior side of the isthmus and meso-salpinx, the tube being patent exeept at the fimbriated extremity. A process of necrosis had set in, rendering the tissue soft, friable, and of a dark red colour. A pediculated mass, two centimetres in length and five millimetres in diameter, sprang from the buried fimbriated end of the tube, its pedicle being twisted from left to right. The mass measured $6\times6\times4\frac{1}{2}$ centimetres, and its surface was of a smooth and brownish-red colour. It eontained clear serous fluid, its walls being two millimetres in thickness. The microseopieal examination proved that there had been hæmorrhage into the tissues.

Pyo-salpinx.—This purulent collection may follow catarrhal salpingitis, and is generally found at the outer end of the tube. The character of the purulent fluid varies considerably. It is generally crowded with epithelial cells. The more frequent causes of purulent inflammation of the tube are septic conditions started by uterine operations, the use of the sound, gonorrhœa, and those other septic states which follow on abortion and miscarriage. Attempts at criminal abortion by rude hands frequently cause these suppurating affections of the tubes and ovaries. The outer extremity of the tube may be closely adherent to an ovary, and this is the more usual condition. Adhesions may attach the tube and ovary to the peritoneum in Douglas' pouch, or to the rectum or uterus. The appendages on both sides are generally involved. This is an important clinical fact to remember in the treatment of pyo-salpinx. The thickness of the suppurating cyst-wall varies. Such a suppurating cavity, contracting adhesions with the rectum or bladder, may burst into either. The pus is generally thick and creamy, and fœtid if the cavity be close to the rectum. This contiguity of the sac to the ovary leads generally to the involvement of the latter, which in its turn becomes purulent, though the suppurating process may have begun in the ovary. This involvement of the broad ligament and ovary is more likely to occur by a spreading of the suppurative process if there be a pre-existing cystic condition of either of these. The wall of the pyogenic cavity is greatly thickened, and has in an exaggerated form all the pathological characteristics of catarrhal salpingitis of the chronic type (infiltration of embryonic and fusiform cells), while near the surface of the mucous lining the cell-growth is so abundant as to have the appearance of granulation tissue.

The important practical bearing of our knowledge of the causation and course of a pyo-salpinx is to enforce these lessons: (*a*) *pyo-salpinx is frequently found in both tubes;* (*b*) *it often involves the ovary in a tubo-ovarian abscess;* (*c*) *if it increase it may become attached by adhesions to the uterus,*

and rupture into it, or to the rectum, and burst into it, or possibly involve the bladder and open into it; (d) the suppuration may be of a tuberculous nature. Remembering this latter factor, we must be careful to inquire through the family history for any corroborative evidence in hereditary predisposition to tubercle, and the presence of the disease in other organs, remembering that the tubercular disease is most probably found at the same time in the uterus and ovary.

FIG. 407.—Papilloma of the Ovary, involving the broad ligaments (Alban Doran). The drawing shows the growth at one side only; the other ovary and ligament were similarly affected.

Papilloma.—Papilloma of the Fallopian tube appears to have an inflammatory origin. It may proceed till large masses of papillomata develop, these growths being perfectly innocent, although they may even provoke ascites and hydrothorax. On the other hand, the papillomatous vegetations may undergo malignant degeneration.

Papilloma of the Fallopian tube is very uncommon. Rokitanski and Hennig described outgrowths from the papillæ seen on the mucous membranes of diseased Fallopian tubes, the latter authority noticing certain transitional stages of growth,

warty, papillary, and polypoid, which are often seen side by side in dropsical tubes (Doran). Alban Doran exhibited a large papilloma of the Fallopian tube presenting such papillary outgrowths at the Pathological Society of London ('Trans.,' 1880). In this particular case ascites and splenetic effusion were associated with the papilloma. Cauliflower excrescences grew from various parts of the mucous membrane of the dilated tube. Amidst these here and there were cysts with papillary outgrowths.

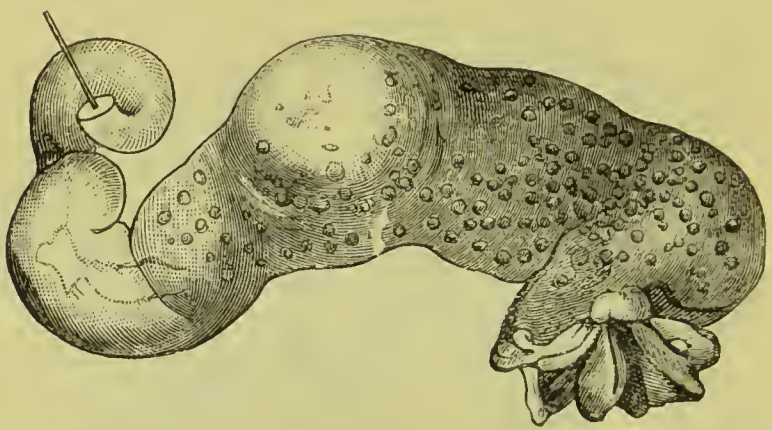


FIG. 408.—Tubercle of the Fallopian Tube, showing general enlargement of the tube, both in length and breadth, with irregular dilatations, corresponding to deep ulcers on the inner surface, filled with caseating tubercle. Miliary tubercles are seen on the peritoneal surface, chiefly near the fimbriated end. The uterine end of the tube is much twisted. The fimbriated end is nearly occluded by purse-string contraction. (Cullingworth.)

Primary carcinoma of the Fallopian tube, a rare disease, occurs near the menopause, and is accompanied by vaginal discharge, generally sanious. Its course is apparently slower than that of cancer in most other organs, certainly far less rapid than in ovarian cancer. Evidence as to the origin and precise nature of sarcoma of the Fallopian tube is as yet very scanty. Only two cases have been recorded.

Tubercular Salpingitis.—The relation of tuberculous inflammation of the Fallopian tube to pelvic peritonitis is a point of considerable practical importance.

It is well exemplified in a case of Cullingworth's, in which abdominal section was carried out for pelvic peritonitis, the patient at the time suffering from tubercle of the apex of the right lung.

'The peritoneal surface of the uterus, Fallopian tubes, and adjacent coils of

FIG. 409.—Tubercular Salpingitis. A, Transverse section of tube under a power of × 50; and B, section through a tubercular nodule under a power of × 250, showing two giant cells. *a*, peritoneum; *b*, tubercular nodules in subperitoneal tissue; *c*, longitudinal muscular coat of Fallopian tube; *d*, bloodvessels; *e*, circular muscular coat; *f*, hypertrophied mucous membrane, showing numerous tubercular nodules containing giant cells—the lining epithelium still remains in places; *g*, lumen of tube; *h*, remains of ciliated epithelium; *i*, giant cells; *k*, epithelioid cells; *l*, Space lined with columnar epithelium. (Cullingworth, drawing by Mr. C. H. James.)

intestine were studded with miliary tubercles. The uterus was pushed forwards by a mass behind it, consisting of a small cystic ovary with the enlarged and thickened right tube curving round it, the whole so densely adherent that nearly an hour was occupied in the separation. The left tube was exceedingly tortuous, much thickened, and universally adherent, the adhesions being more

recent than those on the right side. The left ovary contained a large cyst, but was not enlarged. It was entirely surrounded by adhesions, and its external covering was thickened and opaque.

'On examining the parts removed, the portion of right tube was 3 inches long and 1⅛ broad. The walls were like cartilage, and measured ⅛ to ¼ of an inch in thickness. The mucous membrane was much swollen. The free end of the tube was buried amongst the adhesions. The portion of this left tube measured, while still unstretched, 2½ inches. It was twisted at its uterine end like a cork-screw. At the centre there was a dilated portion ¾ of an inch long, softer than the rest of the tube. The mucous membrane was deeply ulcerated, showing deep pits full of caseating tubercle.'

Charles Noble and Howard Kelly insist on the frequency of tuberculosis of the genitalia and peritoneum. Noble says: 'Three per cent. of the cases operated upon by me during two years were tubercular. Some cases of tubercular trouble may have been overlooked. If further investigation demonstrate that Kelly's statement is true, as a matter of general experience, that 20 per cent. of such cases are tubercular in their nature, this factor will assume an unexpected importance as a cause of pelvic disease in women.'

Tubercle of the Appendages in Virgins.—Alban Doran has drawn attention to the frequency with which the ovaries and tubes are affected with tubercle in young persons in whom there is a hereditary predisposition to its development.

There can now no longer be any doubt that unsuspected primary tubercle of the appendages has been occasionally the cause of the obstinate and prolonged presence of uterine and vaginal discharges and other attendant symptoms which, occurring in virgins, and recently married women with no previous history of any generative affection, were difficult to explain. The presence of a persistent leucorrhœa, pains in the iliac regions, difficulty of locomotion, tendency to cervical erosions, erratic menstruation, slightly enlarged and sensitive ovaries, should prompt to suspicion of tubercle as a possible cause. Such symptoms continuing for any time should lead to inquiry into the family history of the patient. Should that confirm the suspicion, then the case ought to be carefully watched, and discharges should be microscopically examined. If tubercle bacilli be discovered, the prudence of salpingo-oöphorectomy or hystero-salpingo-oöphorectomy has to be considered.

(For the indications for, and the details of, the operation of removal of the appendages, see p. 610.)

Salpingostomy.

Skutch, of Jena, devised the operation of salpingostomy.* It was described before the third meeting of the Deutsche Gesellschaft für Gynäkologie at Freiburg in June, 1889 (see *Centralbl. für Gyn.*, No. 32, 1889). He operated upon a sterile patient, aged thirty-eight, with moderate dilatation of both tubes, which is said to have caused great pain, the ovaries and uterus being apparently free from disease. Some of the fluid contents of each tube were first withdrawn by means of a Pravaz syringe, and found to consist of clear yellow serum free from pus. The ostium was then laid open, the fluid allowed to escape, and an oval piece of the wall, about one square centimetre in size, cut away. The mucous membrane and serous coat were united along the margin of the artificial aperture by fine silk thread. Lastly, a sound was passed through the aperture along the tubal canal into the uterus. Convalescence was uninterrupted. From the day of the operation forward the woman was free from pain.' (Doran.)

Salpingocele.

Hernia of the Fallopian tube may occur into the inguinal canal with or without its associated ovary, though the latter condition is extremely rare. The case of Bilton Pollard (*Lancet*, 1889, vol. ii., p. 165) is an example of hernia of both ovary and portion of the Fallopian tube, the former being strangulated. The

FIG. 410.—Salpingocele, after Ségars. (Bland Sutton.)

symptoms of strangulation of the tube or ovary are much akin to those attending ordinary strangulation of the bowel. The treatment consists in an operation similar to that for hernia—removal of the strangled ovary or tube, the return of the pedicle, and excision of the sac.

* See p. 621 for the various operative procedures resorted to in the conservative surgery of the annexa.

CHAPTER XXXI.

TUBAL PREGNANCY.

One of the greatest advances in surgery since the establishment of ovariotomy is the appreciation of the fact that the various abnormal forms of pregnancy, usually classed as 'extra-uterine gestation,' have their origin in the Fallopian tube.

An oösperm (fertilized ovum) may lodge in any part of the tube, and the course of events varies according to its position. Gestation in the ampulla and isthmus is called tubal; and in the portion which traverses the uterine wall, tubo-uterine pregnancy. The last variety will be considered separately. No one has succeeded in detecting the cause of tubal gestation. It may occur as a first pregnancy in women who have been married eight, ten, or even twenty years; it may follow a normal pregnancy or an abortion within a few months, or occur as a first pregnancy in a woman of twenty or thirty years; in the newly married, or the mother of a large family. Both tubes may be gravid concurrently, or one tube may become pregnant years after its fellow. Tubal may complicate uterine pregnancy. In very many cases tubal pregnancy happens after long intervals of sterility. The fact that pregnancy sometimes occurs in the Fallopian tubes after a long period of sterility has led some writers to believe that the patients have suffered from desquamative salpingitis, and that the destruction of the tubal epithelium hinders the transit of the ovum. Recent observations tend to show that this is not the case, and

the evidence now indicates that *a healthy Fallopian tube is more liable to become gravid than one which has been inflamed.*

The changes which follow the arrest of a fertilized ovum in the tube will be considered under the following headings:

1. Changes in the tube.
2. The tubal mole.
3. Tubal abortion.
4. Rupture of the gestation-sac.
5. The placenta and decidua.

1. *Changes in the Tube.* — The most remarkable change

FIG. 411.—A Tubal Mole, natural size (after Walter).

occurs in the vicinity of the abdominal ostium, which in many cases becomes contracted, and in the course of a few weeks (six to eight) completely occluded. In some instances the ostium dilates instead of closing. When the oösperm is lodged in the isthmus the abdominal ostium is unaffected.

2. *The Tubal Mole.* — The changes which occur in the oösperm are identical, whether it be retained in the Fallopian tube or in the uterine cavity. In each situation it is liable to a curious change whereby it is converted into what is known as a 'mole.'

Tubal moles vary greatly in size: some have a diameter of 1 cm., others measure 5, or even 8, cm. Small tubal moles are

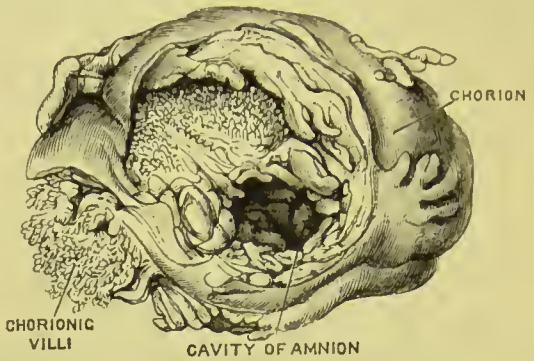


FIG. 412.—A Tubal Mole, natural size (after Bland Sutton).

globular, but after attaining a diameter of 3 cm., they assume an ovoid shape. The amniotic cavity usually occupies an

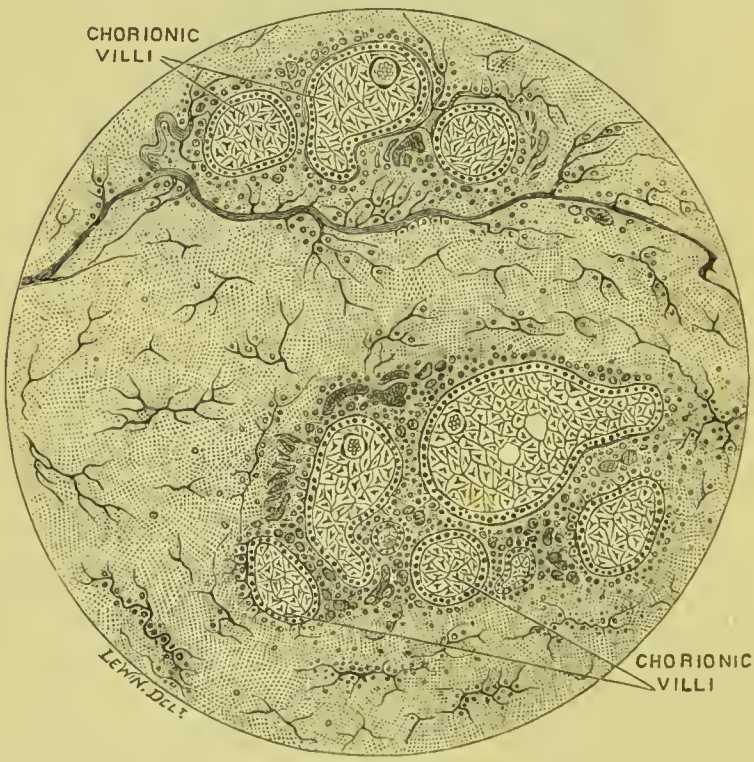


FIG. 413.—Chorionic Villi from a Tubal Mole, magnified (after Bland Sutton).

eccentric position. Occasionally the embryo is detected within it (Fig. 411). More often it escapes or is destroyed by the

original catastrophe which converted the embryo and its membranes into a mole. The outer limiting membrane of a tubal mole is the chorion (Fig. 412). When no embryo, amniotic cavity, or chorionic villi can be detected with the naked eye, the clot must be cut and examined microscopically for sections of chorionic villi. They are very characteristic structures (Fig. 413), and as sure evidence of tubal pregnancy as the embryo itself.

It is a circumstance of great interest, in connection with moles, that the blood-clot of which they are mainly composed is due to extravasation from the fœtal circulation. This is demonstrated by the fact that many of the red corpuscles in the clot possess nuclei. The blood itself is contained between the amnion and the chorion.

3. *Tubal Abortion.*—So long as the abdominal ostium of a gravid tube remains unclosed, the embryo is in constant jeopardy of being extruded through it into the general peritoneal cavity, accompanied by profuse, and often dangerous, bleeding. This accident is known as tubal abortion. In the majority of cases the mole is only partly detached, and remains within the tube; this is 'incomplete tubal abortion,' and is a very dangerous condition, as in consequence of retention of the mole the bleeding is liable to be frequently repeated, and to place the patient's life in grave danger.

4. *Rupture of the Tube.*—Every gravid tube left to itself either aborts or bursts. If the oösperm is disturbed before the ostium is occluded, the probability is in favour of abortion; rupture of a gravid tube with an unclosed ostium is, however, a frequent event. After the ostium is closed, rupture of the tube is almost inevitable at some period between the sixth and tenth week following impregnation. This is called primary rupture, and it may be *intraperitoneal* or *extraperitoneal.*

The determining causes are various, such as jumping from a chair or carriage, vomiting, defæcation, and sexual congress.

Primary Intraperitoneal Rupture.—In this case the rent in the tube allows the blood to flow into the pelvis and inundate

the recto-vaginal fossa. The embryo and its membranes, or a mole, may be detained in the rent or extruded into the peritoneal cavity. The blood effused may amount to two, three, or even four litres. The danger is great, as death may follow rupture in a few hours. Women occasionally survive a limited hæmorrhage, and the blood slowly absorbs. When the bleeding is not excessive, the blood collects in the recto-vaginal fossa and floats up the coils of small intestine, and these, with the omentum, gradually form a covering to the fossa by adhering together, and thus isolate the blood in the pelvis from the general peritoneal cavity. Blood isolated in this way may coagulate in layers and form a spurious cyst-wall.

Primary Extraperitoneal Rupture.—In a fair proportion of cases the tube ruptures in some part of its circumference situated between the layers of the broad ligament; in such circumstances the blood leaks into the connective tissue of the broad ligament and forms what is known as a pelvic hæmatoma. In the case of a mole, this accident is often a favourable termination of the pregnancy. In a certain proportion of cases the pregnancy is not terminated by the rupture, and as the rent in the tube slowly expands, the embryo and its membranes slowly insinuate themselves between the layers of the broad ligament, which thus serve as the boundaries of the gestation-sac. The pregnancy is now termed a broad-ligament (or mesometric) pregnancy.

5. *The Placenta.*—The tubal placenta is peculiar in the fact that it is formed entirely from the chorionic villi, and its primitive character in part explains the peculiarly precarious life of the embryo in this form of gestation. In tubal pregnancy no decidua is formed in the tube, but a well-marked decidua develops in the uterus.

After primary extraperitoneal rupture of a tubal gestation, the future course of events, if the embryo survive, is very largely influenced by the relative positions of the fœtus and placenta.

When the embryo lies above the placenta, the latter grows

and burrows between the layers of the broad ligament until it comes to rest on the floor of the pelvis. Should the embryo lie below the placenta, the fœtus will eventually rest upon the pelvic floor, and the placenta will be displaced upwards as the fœtus grows, a movement which is attended with disastrous consequences, as the frequent displacement leads to hæmorrhage into the substance of the placenta, interfering with its function and, in many cases, causing the death of the fœtus. Profuse hæmorrhage in many cases causes rupture of the sac and places the mother's life in great jeopardy. The movements or migration of the placenta, even when they do not entail the death of the fœtus, seriously imperil its vitality. Tubal fœtuses are very often misshapen; hydrocephalus, club-foot, ectopia of the viscera, and similar deformities, are the rule. When of natural shape, they are often very defective in size. In cases where they have been extracted alive they rarely live many weeks.

Secondary Rupture.—When the embryo and the mother survive primary rupture, the sac, continuing to increase in size, may burst at any moment. When the rent involves the peritoneum and placenta, terrible bleeding and speedy death are the usual consequences. This is known as 'secondary intraperitoneal rupture.' Occasionally the rent takes place very gradually, and the fœtus in its amnion is slowly extruded into, and continues its development in, the peritoneal cavity, the placenta remaining in the pelvis.

Secondary rupture is the usual, but by no means necessary, termination of a broad-ligament gestation. The pregnancy may 'go to term.' Then spurious labour supervenes, pains come and persist for days, then slowly subside; the amniotic fluid is absorbed, the fœtus dies, the fœtal circulation ceases, the placenta atrophies, and the fœtus becomes mummified or partially calcified (lithopædion). During the period of unavailing labour milk may be present in the breasts, and, as a rule, a decidua (Fig. 414) is expelled from the uterus. A mummified fœtus may remain quiescent many months or fifty

years. Should septic organisms gain access to the sac, suppuration and all its attendant evils follow. Finally the abscess bursts into the rectum, bladder, vagina, or through the abdominal wall, and pieces of fœtal tissues are at intervals discharged. This termination is spoken of as secondary extra-peritoneal rupture.

Tubo-Uterine Gestation.—When an oösperm (fertilized ovum) is retained in the uterine section of the Fallopian tube, the pregnancy runs a different course to that observed in the purely

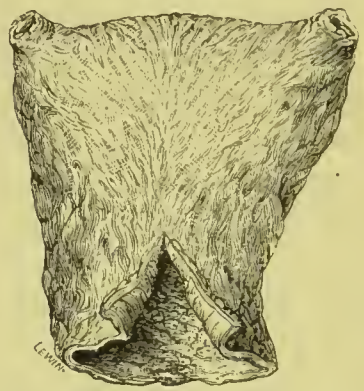


FIG. 414.—A Uterine Decidua expelled in a case of Tubal Pregnancy (after Bland Sutton).

tubal form. Primary rupture may occur as early as the fourth, or be delayed to the sixteenth, week. The sac may rupture into the peritoneal cavity and be rapidly fatal, or into the uterine cavity and be discharged like a uterine embryo. A tubo-uterine embryo or mole is never discharged into the mesometrium (broad ligament). *This variety is very apt to be confounded with pregnancy in the rudimentary cornu of a unicorn uterus.*

Symptoms.—The signs of tubal pregnancy vary with the stage of the gestation. It is of the first importance to remember that in the majority of instances patients are unaware that they are pregnant; occasionally there is a history of amenorrhœa, morning sickness, and fulness of the breasts.

Before Primary Rupture.—Gravid tubes have in a few

instances been removed before primary rupture or abortion; in most of the cases the operations were undertaken for the purpose of removing diseased tubes; subsequent examination of the parts led to the detection of an embryo or a mole. The chief points in this stage are a definite history of a missed menstrual period in a woman previously regular; following this event the patient experiences pelvic pain, which induces her to seek advice. On examination an enlarged tube is detected. When there is no history of old tubal disease, or any fact suggesting septic endometritis or gonorrhœa, then presumption favours a gravid tube.

Primary Rupture or Abortion.—The signs are those characteristic of internal hæmorrhage. There is severe and sudden pelvic pain, followed by pallor, faintness, sighing respiration, feeble pulse, sometimes vomiting and depression of temperature. Death may ensue in a few hours. As the collapse passes off, a few shreds or an entire decidua may be discharged from the uterus. Primary rupture of a gravid tube may kill so quickly that poisoning has many times been suspected, until an autopsy ordered by the coroner has revealed the cause of death.

The severe disturbance set up by rupture of a gravid tube is simulated by lesions of other viscera; for example, perforating ulcer of stomach, duodenum, or vermiform appendix, rupture of a pyosalpinx, acute rotation of an ovarian tumour, renal colic, biliary colic, and acute intestinal obstruction.

When the tube bursts between the layers of the broad ligament—primary extraperitoneal rupture—the symptoms are not so severe, and the signs of shock are not so pronounced, and pass away quicker. On examining by the vagina, a rounded, ill-defined swelling will be felt on one side of the uterus. The difficulty in these cases is to decide whether the rupture be intra- or extra-peritoneal.

In cases which survive primary rupture, and in which the embryo continues to develop, the signs from the third month onward may be summarized thus:

Amenorrhœa : this is a valuable sign.

The discharge of a decidua entire or in fragments.

The presence of milk in the breast is a useful sign ; from its absence nothing can be inferred.

There is a large and gradually increasing painful swelling in one or other broad ligament (mesometrium).

The uterus is slightly enlarged, the os patulous and soft.

In cases where the pregnancy has approached to near term, the outlines of the fœtus may be felt.

In cases where the placental circulation has ceased, and the fœtus is therefore dead, an accurate diagnosis is rarely made.

The diagnosis of an advanced tubal gestation is sometimes very simple, and at others extremely difficult and doubtful. It has been confounded with the following conditions :

(1) Normal pregnancy; (2) retroverted gravid uterus; (3) pregnancy in one horn of a bicorned uterus ; (4) ovarian tumour ; (5) uterine myoma ; (6) tumour of the broad ligament ; (7) fæces in the rectum.

Converse errors have been committed again and again.

It must be remembered that normal and tubal pregnancy may co-exist ; also ovarian tumour and a gravid tube on the same side.

In the very early stages a gravid tube is apt to be confounded with pyo-salpinx, hydro-salpinx, and small ovarian tumours.

Treatment.—The risks and difficulties of operative interference in tubal pregnancy depend mainly upon the stage at which it is required.

At the Period of Primary Rupture or Abortion.—When the symptoms of hæmorrhage are unmistakable and the patient's life is in grave danger, abdominal section should be performed and the bleeding controlled. This method is in strict accordance with the canon of surgery valid in other regions of the body, namely: arrest hæmorrhage at the earliest possible moment.

The method of performing this operation is identical with

oöphorectomy. Occasionally the rent in the tube involves the uterus, and will require to be sutured with gut.

The free blood in the peritoneal cavity may be easily removed by sponges or by a full stream of water at 110° Fahr.

Broad-Ligament Gestation.—When the embryo continues to grow after primary rupture, surgical interference may be demanded at any period on account of secondary rupture. When the gestation has not advanced beyond the fourth month, it is sometimes possible to remove embryo, tube, ovary, and sac by transfixing the broad ligament as in a simple ovariotomy. When the pregnancy has advanced beyond the fourth month, the placenta has become too large to be thus dealt with. The sac is then exposed through an abdominal incision, the fœtus, placenta, and clot evacuated, the bleeding checked with sponges; the edges of the sac are then stitched to the abdominal incision, and its cavity drained. After the fifth month operative measures must be considered under two headings: (1) The treatment of the sac; (2) the treatment of the placenta.

Experience teaches that the safest method is to incise the sac, remove the fœtus, and stitch the edges of the sac to the margin of the incision in the belly-wall.

The most perplexing step is the treatment of the placenta when the fœtus is alive.

1. In some cases the placenta becomes disturbed in the course of the operation; it must then be removed. This is especially liable to be the case when the placenta lies above the fœtus.

2. When the placenta is situated below the fœtus it should be left. If suppuration occur or signs of septicæmia ensue, the wound must be re-opened and the placenta removed.

When the fœtus is dead before the operation is attempted, the placenta should be removed, as there is then no risk of hæmorrhage.

After the death and decomposition of the fœtus, the treatment is very simple: The resulting sinuses should be dilated,

and all fragments of bones, hair, etc., should be removed. When this is thoroughly done, the sinuses rapidly granulate and close.

The great risk of violent hæmorrhage from the placental site renders an operation for tubal pregnancy between the fifth and ninth months, the fœtus being alive, the most formidable in the whole range of surgery. It cannot be urged with too much force *that, when it is fairly evident that a woman has a tubal or a broad-ligament pregnancy, it should be dealt with by operation without delay.*

The fact that operations for the removal of extra-uterine fœtuses are more successful after the fœtal circulation has ceased, has induced some practitioners to advocate destruction of the child's life by electricity before resorting to operation. The results have been very unsatisfactory.

Some attempts have been made to arrest the course of tubal gestation in its earliest stages by the local application of electricity. The results are unsatisfactory, and the practice meets with no encouragement amongst those who have had the greatest experience in this department of medical art.

CHAPTER XXXII.

AFFECTIONS OF THE OVARIES—OVARITIS.

We may thus classify the affections of the ovaries, apart from the Fallopian tubes:

Abnormalities.
- ,, absence.
- ,, imperfect development.
- ,, foreign* bodies in.

Displacements.
- Hernia.
- Prolapse.

Ovaritis.
- ,, non-cystic { acute and
- ,, cystic { chronic.

Solid tumours.
- Carcinoma.
- Sarcoma.
- Fibroma.
- Tubercle.
- Cystoma.

Displacements of the Ovary.

Hernia of the Ovary.†—This is a very rare affection. It is usually congenital and double, but its accidental occurrence as the result of strain or injury is not to be overlooked. Hernia

* Frank W. Haviland (*Medical Record*) reported a case where he removed an extensively adherent pus tube and ovary. The adhesion found involved the sigmoid flexure of the colon, the tube, ovary, uterus and omentum in a large mass. On examination of the ovary an abscess was found, inside of which a needle was discovered. The appearance of the needle, about three-quarters of an inch of an ordinary sewing needle, proved it to have rested there some time. The explanation of its presence there was as follows: That it was swallowed and passed through the alimentary canal until it reached the colon, when it perforated the walls, passed on through a fold of omentum into the peritoneal covering of the posterior wall of the uterus, and thence on into the right ovary, carrying with it infection from the alimentary canal.

† See p. 585, Salpingocele.

of the ovary is generally associated with some congenital malformation of the genital organs, either uterus or vagina, or both.

Diagnosis.—A swelling is found in the inguinal region about the size of a walnut, which on coughing may protrude into the inguinal canal. In drawing the uterus down with a hook or vulsellum, the tumour is dragged on and pulled with the uterus. An interesting case of double hernia of the ovary, with congenital malformation of the uterus and vagina, was brought before the Gynæcological Society. Hulke removed one ovary, and Heywood Smith the other. Should the ovary be painful, with associated menstrual and reflex troubles, the best course to pursue is to remove it. A hollow shield may be worn.

Prolapsus.

Varieties (Mundé):

Retro-lateral.
Retro-uterine.
Ante-uterine.
In the infundibulum of an inverted uterus.

Causes:

Pregnancy and parturition.
Uterine displacements.
Congestive states.
Sudden jolts, etc.

Diagnosis.—On examination by the vagina and rectum, the sensitive ovary is felt in its altered position.

Treatment.—Avoidance of coitus; the hot vaginal (medicated) douche; a course at Woodhall Spa; such aperient waters as those of Victoria and Hunyadi Janos; bromides internally. A soft air or glycerine ring pessary is often of service, or the Hodge with glycerine air-pad. The patient should sleep with the bed raised about six inches at the foot. Mundé has devised a special pessary for lateral prolapse. But the surgeon may mould a soft pessary to the required shape, according to the position of the ovary.

Removal of the prolapsed ovary by drawing it down with an ovum forceps through an incision in the posterior vaginal wall, ligaturing and cutting off by scissors, leaving the incision open for drainage, advocated by Duke, is practically Battey's original operation.

Ovaritis.

Etiology, Causation, and Pathology.—In the earlier editions of this work ovaritis was associated generally with perimetric inflammations, as it is most frequently met with either as a complication or extension of these affections. 'We believe,' says Emmet, 'that the ovaries suffer far more from peritonitis or cellulitis in their vicinity than from disease originating within or confined to their own structure.' Still, it is doubtful whether inflammation of the pelvic peritoneum may not more frequently originate in the ovary (Aran) or Fallopian tube than we think. The ovary is more or less involved in every severe case of perimetritis. On the other hand, uterine inflammatory conditions may arise as secondary results of both acute and chronic ovarian hyperæmia and inflammation.

Active hyperæmia, however, of the ovary may persist for a length of time, without further consequences than hypertrophy of the connective tissue and interstitial thickening, with effusion. This hyperæmia leads to areolar thickening, and this to pressure on, and obliteration of, the follicles, and this causes further cicatrization of the connective tissue, and, ultimately, a cirrhotic state of the organ. In the thickening of the peripheral layers of the stroma we have a satisfactory explanation of the accompanying sterility, for the ripened ovum cannot escape. Abscess and cystic degeneration are the occasional results of either acute inflammation or prolonged congestion. Cysts may form from the extravasation of blood, and the degeneration and absorption of the coagulum.

One of the most recent classifications of ovaritis is that of Paul Petit (*lib. cit.*), which is as follows :

- Ovaritis—Non-cystic
  - Acute
    - Cortical.
    - Interstitial.
    - Parenchymatous.
  - Chronic
    - Cortical
      - Hypertrophic.
      - Atrophic.
    - Disseminated
- Ovaritis—Cystic
  - (*a*) Hydro-cysts
    - Dropsy of the follicles.
    - Dropsy of the stroma.
  - (*b*) Hæmato-cysts
    - Follicular
      - Multiple and small
        - Due to infection.
      - Larger and fewer in number
        - Due to perimetric inflammation.
    - In corpora lutea.
    - In stroma—Mixed.
  - (*c*) Pyo-cyst.

Cortical Ovaritis.

Bonnet and Petit* describe the ovaritis of cortical origin as secondary to inflammation around the ovary, commonly caused by gonorrhœa. In it the serous covering of the ovary is affected. It is enlarged, and its capsule is thickened. Diffuse interstitial ovaritis is due to puerperal infection; the ovary is largely increased in size, engorged with fluid, and the cystic follicles have either serous or sanguineous contents, the stroma being the seat of a diffuse embryonic infiltration. Later on pus appears in the lymph spaces or the follicle. Parenchymatous ovaritis is due to infectious diseases. The lesions are concentrated in the corpora lutea, or the primordial follicle is exclusively attacked or completely disappears. In chronic ovaritis the connective tissue is gradually transformed into dense and undulating fibrous tissue, poor in cells and bloodvessels. The connective tissue is thickened around the vessels, encroaching on the corpora lutea and the

* *Lib. cit.*, for this pathological summary.

ovarian follicles. Such a condition leads on to sclerosis, and in the new formation are variously shaped spaces, remains of bloodvessels, lymphatics, or ovisacs, thus leading up to the serous, sero-sanguineous, and sanguineous cystic condition. In chronic cortical ovaritis the ovary is surrounded by false

FIG. 415.—Chronic Cortical Ovaritis (×30 diameters). A, A, Sclerosis of albugineous layer; B, B, follicular cysts; C, C, corpora lutea degenerating; D, D, the same, separated by hæmorrhagic infarctions; D, corpus luteum changed into a small hæmorrhagic cyst; E, E, interstitial hæmorrhages; F, interstitial tissue in process of sclerosis (Bonnet and Petit). Compare with Normal Section, p. 602.

membranes, in which may be found sanguineous collections. The process of sclerosis invades with varying degrees of thickness the ovary; the resulting obstruction to the circulation favours a serous effusion into the follicles, and possibly hæmorrhagic infarctions. The consequence is a general disorganization of the ovary, in which a sclerosed capsule, cystic follicles, hæmorrhagic cysts, hæmorrhagic interstitial effusions, and interstitial sclerosed changes, are found on a section of its substance.

FIG. 416.—Section of Normal Ovary (× 30 diameters). *e*, Fine connective tunica albuginea; *s*, spindle-celled layer of the zona parenchymatosa or stroma; 1, 2, 3, Graäfian follicles, the largest of which are internal, but grow towards the surface. (Macalister.)*

* 'Each Graäfian follicle consists of (1) a tunica fibrosa, or the differentiated envelope derived from the adjacent part of the stroma, which consist of fine connective-tissue with spindle cells; (2) a very delicate structureless membrana pellucida; (3) an irregular thick epithelial layer of columnar cells, the membrana granulosa, which at one part is thickened, forming the discus proliferus; (4) within this is a drop of clear *liquor folliculi*, in which floats a nucleated cell, the ovum. Rupture of a Graäfian follicle occurs at each menstrual period, and the cavity of the burst follicle become filled with an exudation of a peculiar reddish-yellow colour, becoming cicatricial tissue, with a radial arrangement of its fibres, formed by the infiltration of the stroma cells and the follicle, and their proliferation as a folded wall, corpus luteum, which gradually diminishes by the growth into it of normal stroma cells after the tenth day, but does not disappear for about two months. If the ovum becomes impregnated, the corpus luteum is large, and shows a trace of a central gravity owing to the increased vascularity of all the parts, and does not disappear for about eight months. Some few follicles collapse and shrivel without rupture.'—'Text-Book of Human Anatomy,' by Alexander Macalister, F.R.S. (Charles Griffin and Co.).

OTHER FORMS OF CHRONIC OVARITIS.

The remaining forms of chronic ovaritis are distinguished by varying degrees of hypertrophy and development of fibrous tissue in the interstitial stroma of the ovary, around the vessels and in the vicinity of the ovisacs and the follicles. The consequence is a contraction of the ovarian stroma, which presents, at least in part, an atrophic or *cirrhosed* condition. Mingled in this cirrhotic tissue are small purulent deposits, the remains of separated follicles and cystic cavities. Such pseudo-hypertrophic changes are to be kept quite apart from *true hypertrophy* (Lawson Tait and Slavjansky), in which the normal tissues of the ovary are greatly enlarged, often to the extent of 60 to 70 grammes (Tait).

Cystic Ovaritis.

Hydro-cystic.

In the *hydro-cystic* degeneration of the ovarian stroma there is an attendant sclerosis. The follicular cysts are unilocular and spherical, varying from the size of a small cherry to a walnut, and occasionally larger. Such cystic degeneration, with the associated hypertrophic changes, may increase the size of the ovary to that of the closed fist. On section the cyst presents a wall with a double contour and a smooth surface, and it is filled with a colourless and limpid fluid. Ovules are not found in those of a smaller size. They disappear in the cell proliferation which accompanies the cystic formation, when the normal epithelium passes into a granular or colloidal degeneration. These dropsical follicles are situate in a surrounding bed of sclerosed ovarian tissue. With this the wall of the follicle is finally blended, so as to destroy all trace of the distinctive follicular wall. This hydro-cystic change in the follicles of the ovary may be attended by a corresponding dropsical degeneration (serous pseudo-cysts) in the stroma, the result of œdema.

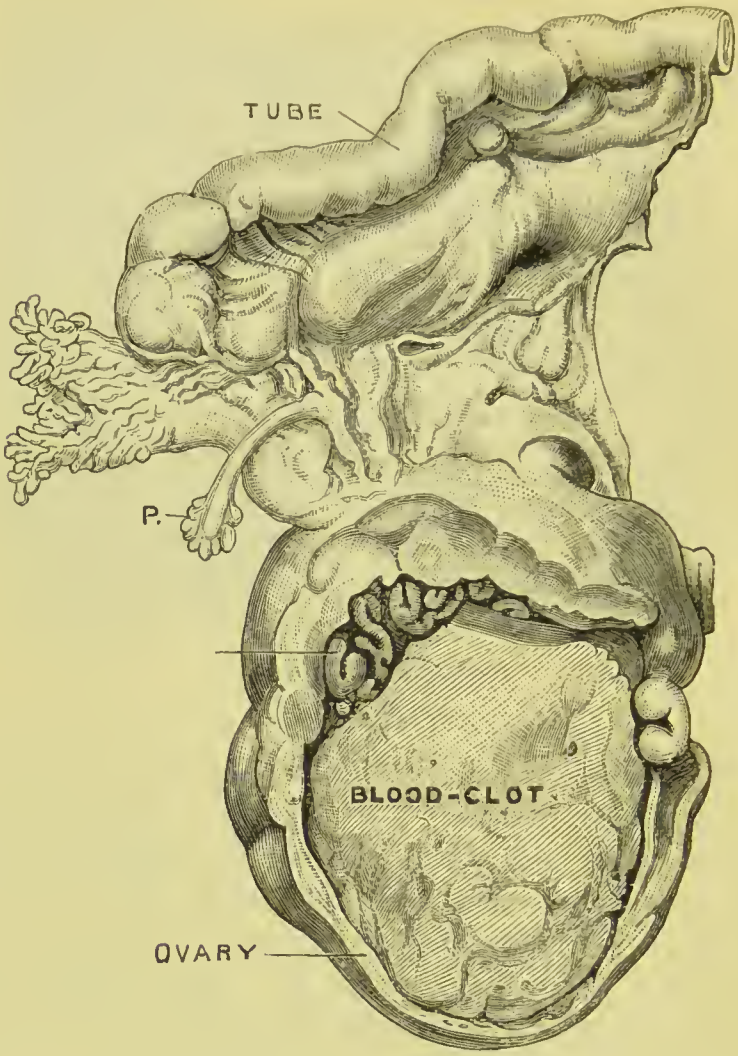


FIG. 417.—Apoplexy of the Ovary (Doran).

'The tumour consisted of the right ovary. It weighed two ounces, and measured two inches and a half in vertical diameter, and one inch and five-eighths horizontally. The surface was of a dull drab colour, and puckered. A large, single-chambered cavity occupied the interior of the ovary. It was filled with a tough yellow substance. The membrane in zigzag folds was deficient towards the yellow substance, so that it partially enclosed a space (resembling in all respects the cavity of a well-formed corpus luteum) which, where not bounded by the membrane, opened out against the yellow substance. On removing the substance from the cavity in which it was embedded in one of the half-sections, the space partially enclosed by the zigzag membrane was found to open out into that cavity. The above appearances indicated the rupture of a mature follicle into the stroma, with subsequent hæmorrhage.'

Hæmato-cystic.

The *sanguineous* or *hæmorrhagic cysts* vary greatly in size. (I have removed two such cysts from one patient, each of which was the size of an orange.) The smaller or multiple (hæmato-follicular) are disseminated throughout the entire ovarian stroma; this, according to Petit, represents the mode in which septicæmic ovaritis affects the organ. The larger ones are more probably due to a hæmorrhage into the interior of a hydro-cyst. This variety is associated with a cortical sclerosis. The cyst has a fibrous wall of varying consistence. The parietal epithelium is altered or, more generally, destroyed. Other blood-cysts are associated with the physiological rupture of the Graäfian follicles. The microscopical features of such cysts serve to distinguish them.

In the interstitial hæmorrhagic cyst the flow of blood has been more diffused. The extravasated blood becomes encysted, and the entire substance of the ovary may thus be of the consistence of the splenic pulp. This class of hæmorrhage more frequently follows acute ovaritis.

At the British Gynæcological Society, on February 9, 1893, I showed the ovaries and Fallopian tubes of a patient, aged thirty-nine, married, one child, who had first come to me in 1889 with retroversion of the uterus and enlarged ovaries. Notwithstanding palliative treatment, she continued to suffer great pain, and life became intolerable. On operating, a large paroöphoritic cyst, with the Fallopian tube lying over it, was found *at either side*. The cysts were filled with blood. The recovery was uninterrupted.

Fig. 417 represents '*apoplexy of the ovary*'—*chronic hæmato-cystic hæmorrhage of Petit*. It shows a tumour removed by Alban Doran ('Obstetrical Society's Transactions,' 1890).

In referring to this case Doran says:

'The general appearance of the diseased ovary, and the relations of the corpus luteum to the cavity, indicated a pathological condition which bore no relation to incipient cystoma of the organ.

'No rent nor cicatrix of a rent, nor any aperture nor fistulous track could be detected on the surface of the ovary. The two dilated follicles bore no cicatrices.'

Alban Doran remarks that Olshausen, in his excellent 'Krankheiten der Ovarien,' divides ovarian apoplexy into two varieties: hæmorrhage into the follicles and hæmorrhage into the stroma. In pure examples of the second variety, which follow local congestion and are seen as complications of scurvy, typhoid and other fevers, the stroma becomes converted into a spongy substance full of fluid blood, resembling the spleen.

'The present specimen, as proved by the appearances described, is an example of ovarian apoplexy originating in a follicle, but involving the stroma through rupture of the follicle. Olshausen, who recognises this secondary form of hæmorrhage into the stroma, describes an apparently similar case. Whilst small apoplexies disappear, as a rule, through reabsorption, and leave no trace behind, large effusions may lead to the partial or complete destruction of the parenchyma, involving in the latter case the conversion of the ovary into a single cyst, filled with a thick, greasy mass.'

Pyocystic Ovaritis

Begins generally in the ovisacs, or in the lymphatic spaces in the form of small multiple abscesses, which are gradually blended by fusion of their walls through necrosis of the interposed embryonic tissue. The size varies. They frequently are imbedded in a bed composed from within outward of embryonic, fibrous, and cellulo-vascular tissue. Bonnet and Petit record a case in which a follicular cyst contained an abscess the size of a pigeon's egg. This cyst was situated near a larger cyst of the same nature, the contents of which were serous and the surrounding stroma was normal. The pyogenic germs they consider were carried by the vessels of the hilum. They point out that an ovarian abscess in developing itself has a tendency to double over the broad ligament, so as to assume the appearance of a phlegmon of the latter.

Briefly I may summarize the changes thus:

1. *Follicular degeneration of Graäfian follicles.*

2. *Interstitial changes in the stroma—neoplasms, sclerosis, cirrhosis, encysted abscesses.*

3. *Sub-peritoneal thickening of the albuginea due to peritoneal inflammation.*

4. *Various adhesions of the ovaries to the surrounding pelvic structures.*

5. *Liquefaction of interstitial effusions of lymph and blood, furnishing secondary serous, caseous, and sanguineous contents of cysts.*

We are especially indebted to Nagel, Gusserow, and Petit for more accurate knowledge of these pathological changes.

Causation.—A case of uncomplicated ovaritis is rare. Still, we occasionally meet with it, both as a result of chill taken at the menstrual period, and in the early stages of gonorrhœa.

During my eleven years' connection with the Cork Fever Hospital, I frequently saw well-marked cases of ovaritis in patients suffering from typhoid fever. It is of course impossible in such cases, or in the exanthemata, to say how far the ovaries may have been involved by previous inflammatory or degenerative changes. Again, in typhoid fever we can readily understand how the ovaries may become involved in the adjacent peritoneal and glandular mischief.

Matthews Duncan attributed the occurrence of ovaritis frequently to the abuse of alcohol. Reflex excitement of the ovarian nerves may originate it, much in the same manner as orchitis occurs in the male. Hence we have it following excessive sexual intercourse, masturbation, and the passage of the uterine sound. I have no doubt that such reflex nerve disturbance frequently leads to more grave results than we could possibly anticipate from so slight an exciting cause as the use of the sound. I believe the analogous febrile condition in the female, which Sir Andrew Clark drew attention to as arising from the passage of the catheter in the male, may be accounted for in precisely the same manner.

Diagnosis.—Place the patient on the couch in Sims' position, with the hips slightly elevated. Let the body be inclined well forwards As she lies on the left side, introduce the right forefinger into the vagina. With the left hand depress well the parietes over the right inguinal region. We can thus generally get the ovary between the two hands. The enlarged and painful ovary may be felt (*a*) by palpation, through the abdominal

wall; (*b*) by the vagina, by a careful digital examination; (*c*) by rectal exploration, and especially by the conjoined recto-vaginal examination. It may vary in size, feeling about the size of a large almond, or even of a pigeon's egg. Pressure on the ovary excites pain. Unfortunately, however, pain in a woman who is hysterical and nervous can be made the excuse for any or every form of unjustifiable charlatanism. We must largely discount the exaggerated sensitiveness complained of when making our diagnosis, and not attach too great an importance to it.

'Who,' asks Emmet, 'are the sufferers from a condition which has been termed an *irritable ovary?* The young girl who has had her brain developed out of season; the woman who has been disappointed or crossed in love by some man not worthy of her' (and, he might have added, the girl who is made the subject of unsatisfying and exciting embraces, foolishly permitted and condoned during long engagements); 'those who have been ill-mated and often unmated; she who has sold her person, under the guise of marriage, for money or position; the prostitute; and she who degrades herself and sacrifices her womanhood by resorting to means to prevent conception. In all of these the nervous system has been first abused, and then nutrition has suffered, some accident only locating the effects in the ovary.'

Symptoms and Physical Signs.—These will depend on the severity of the attack, the presence of any collateral disease, or the acute or chronic nature of the affection. Ovarian congestion may be accompanied by any form of pelvic or uterine inflammation. Hence the gravity of the symptoms will depend on the nature and course of the attack. This, as we have seen, may cease at active hyperæmia, or may run on to pelvic abscess and pyo-salpinx or ovarian abscess and pyo-cyst. Ovaritis, acute and chronic, may be attended by any or all of the following symptoms: oöphoria; dysoötocia; dysmenorrhœa; dyspareunia; hysteria and hystero-epilepsy; various remote (reflex) pains; neuralgia; inability to walk; pain in defæcation; sterility. (See chapter on 'Uterine Reflexes,' p. 297.)

Treatment.—Complete rest when there is any acute inflammation; the knee-elbow position assumed for some time daily (Goodell)—the bed or couch on which the patient lies may have the foot raised about four inches by blocks of wood or

long castors, as suggested by Heywood Smith; avoidance of sexual intercourse; leeches to the inguinal region or the anus; vesication over the inguinal region; iodine paint applied over the same part, or a combination of chloroform (ʒi.), liniment of belladonna (ʒss.), mastich (ʒii.), camphor (ʒii.), and rectified spirit (ʒi.), applied with a thick brush. This is an admirable

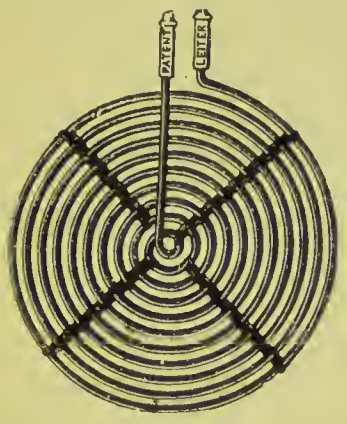


FIG. 418.—Leiter's Irrigator.

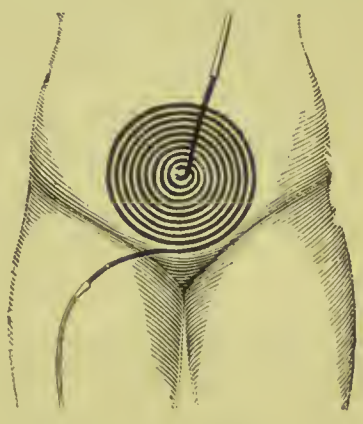


FIG. 418*a*.—Leiter's Irrigator applied.

application to relieve pain. It forms a pigment, and can be reapplied daily. Leiter's irrigator can be applied during inflammatory states. The bromides may be given internally, and, in the chronic stage, iodide of potassium. If dysmenorrhœa, hysteria, hystero-epilepsy, neuralgia, persist, and render the woman's life miserable, the operation of removal of the appendages is to be considered, and, after due consideration, performed.

CHAPTER XXXIII.

AFFECTIONS OF THE OVARIES (continued).

The Indications for the Operation of Salpingo-Oöphorectomy.

It is, unfortunately, true that differences of opinion still exist as to the grounds on which it is justifiable to remove a woman's ovaries and uterine appendages. In medical societies and medical literature strong language has been used on either side, both by those who favour, and those who oppose, the operation under certain conditions. It is no exaggeration to say that statements, as regards the responsibility, even the criminality, of those who hold for the operation, have been made that ought never to have found a place in scientific discussions. This is the more to be regretted, seeing that those who have thus intemperately declared themselves are clearly biased, and, in some instances, have shown a petty spirit of personal animus to certain distinguished operators. It is the more unfortunate, as such opinions and expressions are repeated, and are often retailed in exaggerated terms by patients or their women-friends, who have of late come to discuss removal of the ovaries by the surgeon much as they would the alteration in some fashionable costume by their dress-maker. The introduction of electrolysis as a means of treatment for some of the states for which oöphorectomy is performed has recently accentuated this difference of opinion, both on the part of those who hold, and those who do not

hold, to its efficacy as a means of cure. A reference to the reports of the discussions at the British Gynæcological Society, at the International Medical Congress at Washington, and the more recent utterances of Keith, in his communications on the subject of electrolysis, exhibit the undue, if not unseemly, bias displayed by opposing authorities in the consideration of such questions. As to the value of the galvanic current in the cure of many of the states for which oöphorectomy is resorted to, the evidence is contradictory, and certainly the treatment has not been generally adopted in Great Britain (*vide* chapter on Electro-Therapeutics).

The question remains, On what grounds are we justified in removing the ovaries and appendages in a woman for disease in the ovaries or Fallopian tubes? Every now and then we meet with cases in which every known means has been tried to combat pain, to enable a patient to walk, to tide over with safety menstrual periods, to reduce localized swellings, which recur in the broad ligaments and pelvic peritoneum; in short, to render life bearable and enable the patient to move about in society.

In many of these cases we can date the commencement of such to some attack of perimetritis. There may have been a gonorrhœa. In others we find nothing definite: some history of dysmenorrhœa, menorrhagia, periodical peritoneal attacks, sterility and futile operations on the cervix, with all those symptoms included under the ambiguous term of chronic ovaritis. Examination by the vagina reveals at the most a uterus drawn out of place by an old adhesion, a displaced or painful ovary, some localized swelling, a sensitive uterus. It is in such women that Tait's operation appears to be called for and justifiable. Be it remembered, however, a low mortality on the part of any operator is no justification for the resort to this serious step by every ''prentice hand' who happens to meet a case in which he thinks the indications for operation are present. Tait always strongly insists on this. And not only have we to consider the operator's skill, but also the in-

herent difficulties—indeed, we may truthfully say, the impossibilities of diagnosis. No man has shown this latter contingency more clearly than Tait himself. He has again and again exhibited specimens of ovaries and diseased Fallopian tubes, removed under circumstances far different from those for which this operation was originally proposed, and even carried out. A tense and distended Fallopian tube has been mistaken in vaginal examination for fibromyoma; hydro- and pyo-salpinx have been mistaken for ovarian tumour, and *vice versâ*. The menorrhagia, dysmenorrhœa, and localized swelling which are present in pyo-salpinx, as a rule, are not in themselves sufficient to secure an accurate diagnosis, and it must always occur, even to the most distinguished surgeons, that only by an abdominal section can the certainty of the disease be arrived at. In a letter to the author on the subject, Tait says: 'Concerning the removal of the uterine appendages, the points that I want to lay stress upon are, chiefly: First, that no operation for the removal of the uterine appendages ought to be left unfinished. *The opprobrium of all this class of work will in the future be unfinished operations.* They are far more difficult than any other operations in abdominal surgery, and therefore their undertaking should be limited to a relatively small number of men. Second, that if for chronic inflammatory disease it is necessary to remove one set of appendages, both ought to be removed, because a second operation will in all probability be required, and these second operations are far more dangerous than the first.'

But (as Sir Spencer Wells remarks) cases are by no means few (and I have known some startling instances of the fact) where operation has been advised and declined by the patient or consultant, yet recovery has followed other treatment, and the unmutilated woman has married and borne children.

A most distinguished surgeon at San Francisco stitched the cervix for laceration, the uterus having been previously curetted for what was thought to be fungoid endometritis. The lady was subsequently under my care in 1886. The uterus was then enlarged, very sensitive, and there was a discharge from the endometrium. The ovaries were both slightly enlarged. She underwent a

course of treatment at my hands, including a protracted stay at Woodhall Spa. She returned to America, and after a time, her symptoms returning, she was urged to have oöphorectomy performed. She refused to do so without my consent. This, after a full correspondence, I would not give. Suffice it to say that I was present at the accouchement of that lady in London in 1889, and that now she is in perfect health. I merely quote this particular case to establish the truth of the statement made in the text. (See 'Conservative Surgery of the Annexa,' p. 621, and the operations of Polk, Barrow, Pozzi, and Martin.)

Here is another case in point, which shows the discrimination that must be exercised before *both* appendages are ablated:

Pregnancy after Oöphorectomy and Removal of an Ovarian Blood Cyst; the other Ovary atrophied and adherent.

On April 13, 1893, at the Gynæcological Society, I exhibited an ovarian blood cyst, which I had removed from a patient under peculiar circumstances. She was thirty years of age at the time of operation, and had been married for seven years, never having conceived. In 1883, at the age of 20, she had an attack of pelvic peritonitis. In 1884 she had a recurrence, which spread into general peritonitis of a most alarming character, and which nearly proved fatal. This was in January, 1884, and six months later there was another attack. On and off after this she suffered from abdominal and pelvic pains, but gradually improved. In 1886 she was married; in 1889 she consulted me for a severe cervical erosion, and there was then decided enlargement of the left ovary. I treated her, cured the uterine affection, and sent her for a course to Woodhall Spa. During 1892 the recurrent pains from which she had suffered more or less for years became more constant, and at last, especially at the right side, were incessant. In February, 1893, I performed salpingo-oöphorectomy, Heywood Smith assisting me. On opening the abdomen, the peritoneum was found extensively adherent to the bowel, which latter was opened for a short distance in trying to make the peritoneal incision. Another peritoneal opening had, in consequence, to be made in the left inguinal region. The sac of the left ovary was found about the size of an orange, and full of blood, completely bound down by adhesions, which were separated with difficulty. The cyst with the left tube was removed entire. *On seeking for the right ovary, it could not be found, and it was only after considerable searching that it was detected firmly attached to the pelvic wall*, to which it was fixed by adhesions, and considerably reduced in size. The prudence of removing it was discussed, but in the face of the protracted operation and the exhausted condition of the patient, it was considered wiser not to subject her to any additional shock, which the attempted removal of the firmly-adherent and apparently atrophied ovary would involve. A drainage tube was inserted after operation, and she made an uninterrupted recovery. Menstruation continued, and on and off she suffered again from pelvic pains in the right side, and in 1894 there was a distinct swelling to be felt in the right broad ligament. This disappeared, but there was always more or less distress and pain, especially with the menstrual

periods. Towards the end of 1895 menstruation ceased, and I found that she was pregnant. She was delivered of a male child by Dr. Taylor, of Richmond, on May 31, 1896. The case carries its own lesson.

In view of the differences of opinion, both as regards the justification for, and the permanent benefit derived from, the operation of removal of the appendages, it may be well first to briefly recapitulate the indications which in the author's opinion justify the operation of removal of the uterine annexa :

1. Certain forms (see p. 490) of uterine myomata which from any cause threaten life.

2. Diseased conditions of the ovaries that resist all palliative treatment, and which both embitter and endanger life.

3. Those conditions of the Fallopian tubes, isolated or associated, which are not amenable to other means of cure, and in which sudden danger to life may arise, or where there is such constant suffering as to make life miserable.

4. Certain cases of pelvic suppuration when the annexa are involved. These have already been dealt with in treating of pelvic suppurations (p. 361).

5. Some incurable cases of dysmenorrhœa, unaffected by any course of palliative treatment, or milder operative measures undertaken for the relief of pain, and other attendant neuroses. In these cases the association of any of the previous conditions adds to the expediency and justification of operation.

6. Those cases of epilepsy and hystero epilepsy in which there is clear evidence of correlation between these attacks and such affections as ovaritis, ovarian displacements, enlargements, or degenerations, with or without accompanying tubal pathological conditions.

Both ovaries and both Fallopian tubes should be removed (*a*) where the operation is performed for the arrest of growth and hæmorrhage in myoma ; (*b*) in dysmenorrhœa where the object is to produce premature change of life ; (*c*) in neuroses associated with dysmenorrhœa, recurrent ovaritis, displaced and sensitive ovaries ; (*d*) where both ovaries and both tubes, or one ovary and both tubes, are diseased.

7. *The operation is only to be undertaken after full consideration, and when the consequences and risks are fairly placed before the patient and her immediate relatives.*

Nor should the patient be allowed to believe that the operation of oöphorectomy or salpingo-oöphorectomy is always a simple one. On the contrary, peritoneal adhesions to the intestines, deep pelvic attachments of the ovaries and tubes, ovarian cystic collections of blood and pus, pyo- and hæmato-salpinx, may render it a most difficult matter to remove the appendages cleanly and aseptically.

(The special indications for the step in the instance of uterine myomata have been already fully and separately dealt with.)

It is due to that most distinguished surgeon, Mary Dixon Jones, of Brooklyn, whose excellent surgical and pathological work is well known, to give her opinions precedence on this question—one of such vital moment to her own sex. She says:

'In plastic peritonitis, when the tubes and ovaries are bound in with pseudo-membranes, as also in purulent peritonitis, when there are larger or smaller abscesses, in connection with, and as a result of, disease of the tubes and ovaries, the only way of permanent cure is by removal of the diseased structures.'

'The fearful consequences of these diseases, whether produced by gonorrhœal infection or from the introduction in various ways of staphylococci or streptococci, should urge us to consider some mode of protection. No disease is more serious in its possible results. No greater calamity can happen to a woman. It blights for ever her dearest hopes, cruelly darkens many of her brightest visions, and destroys for ever the organs that make her a woman, and by which she may become a mother. The removal of the diseased uterine appendages by surgery is only to save her from more serious possibilities. With or without an operation she is sterile.'

And in another able communication on 'Oöphorectomy in Diseases of the Nervous System,' the following sentences occur:

'I make the "uncompromising" sweep of excluding all cases from this operation, except where there is hopeless disease of the organs themselves; that is, I denounce the removal of the uterine appendages for any cause, neurotic condition, constitutional disturbance, or for any reason except for incurable disease. When thus diseased they are a continual injury to the system, and their removal is a

lasting benefit. To remove healthy organs for any "grave" condition of the general system should not be thought of, and cannot, under any circumstances, eventuate in any good; for the normal action and physiological function of healthy organs will always increase the life force, and assist in restoring the system, in whatever way diseased, to a state of health.'

Speaking of gyroma and varicose states of the nerve fibres in the uterus, she says:

'Nerve fibres of this kind, so placed, will cause pains aggravated at every menstrual period, or, if in connection with the vaso-motor system, may cause epileptic fits. Such imprisonment and pressure of nerve fibres must frequently take place in ovaries where there are gyroma, these hard, dense, firm, fibrous formations. I have, in some instances, counted as many as five gyroma in one section of the ovary. I believe that when we have made more thorough pathological research most of the cases of severe local pain accompanied by various neuroses will be found in patients who have gyroma.'

In regard to the well-known clinical and pathological correlation of pelvic symptoms occurring out of all proportion to the gravity of the pathological appearances, she makes these important remarks:

'I presented microscopical slides of a number of ovaries, so affected, to the New York Pathological Society. I gave a specimen of one to Professor Prudden, then president of the society, and sent a microscopical slide of the same ovary to Waldeyer of Berlin. Both of these eminent pathologists, from a microscopical examination, returned a written diagnosis of "carcinoma."

'*We cannot always tell by ocular appearance whether an ovary is diseased or not.* Some of the most seriously diseased ovaries I have ever examined, and which were removed because the woman had untold suffering—in some instances the sufferings were so severe that their lives were almost compromised—yet, from external or naked-eye appearances of the organs, there were no special indications of disease. One such ovary I found, by microscopical examination, to be infiltrated with cancer; another had endothelioma so far advanced that it gave the patient the appearance of a far-advanced stage of phthisis.'

Speaking of pyo-salpinx, abscesses of the ovaries, extra-uterine pregnancy, and hydro- and hæmato-salpinx, she states:

'There is no doubt in the minds of those who see the most of these conditions, that the proper treatment of them is their early removal by cœliotomy; but this teaching has not been thoroughly accepted by the profession, therefore the necessity for repeatedly insisting upon it. Without operation, it is only by accident that such patients ever become well, and those who do become well run many risks which could be avoided by prompt operation—risks far exceeding those of the operative treatment. Delay in operating in this class of cases brings these unfortunate sufferers to the condition of chronic invalidism.

These are the patients that have been in bed for months or years with repeated attacks of peritonitis ; and often, under the too prevalent method of management, they come into the hands of the surgeon emaciated wrecks, pus-poisoned, with depraved nutrition, and with a shattered nervous system, and perhaps with crippled vital organs. These are the patients that die after operation, should this prove difficult and tedious. But, worse than that, these are the patients who are not perfectly cured by operation, nor is it to be wondered at that they are not restored to perfect health, Habits of invalidism when long continued are hard to break up ; lost nervous tone is difficult to restore, and emaciation beyond a certain point leaves a permanent impress upon the body. These reasons of a general character for the failure to cure all of these cases are sufficiently apparent ; but in addition to them we have the local results of these diseases to contend with. Repeated attacks of peritonitis result in the agglutination of all the abdominal viscera contiguous to the pelvis. Bowels, omentum, bladder, and sexual organs become fused together. In cases of suppurative disease, the bowels contiguous to the pus-sacs are apt to become infiltrated with pus, and their walls to undergo caseous degeneration, thereby giving rise in many cases to the occurrence of fæcal fistula or to post-operative intestinal adhesions. Such cases, when of long standing, are especially difficult to deal with. The adhesions have become organized, making them difficult to break up, and also leaving extensive raw surfaces in the abdominal and pelvic cavities. It is not to be wondered at that post-operative adhesions form in some of these cases. When operated upon early the adhesions are not organized, and the exudate will disappear after the operation by absorption, and thus the peritoneum is left in a decidedly more normal condition.

'The policy of delay works badly in every way. While this policy is pursued, these poor women continue to be invalids ; many of them die from intercurrent attacks of peritonitis, and those who live on, when finally they submit to operation, do so with lessened chances of recovery from the operation, and, unfortunately, also with greatly increased chances of but partial restoration to health. It is only by the resources of the greatest good judgment and therapeutic skill that many of these poor sufferers are restored to health by prolonged management after operation.'

Williams of Baltimore says : 'For the last three or four years I have received a large number of tubes and ovaries in Baltimore ; in fact, I have received all that were removed by five different operators for examination, so that I am able to say what few other men can, that a very considerable number of the operations are done absolutely with no justification : as the result of my work covering at least 300 tubes and ovaries, that in at least 5 per cent. of the cases there was absolutely no anatomical ground for removing them. . . . I have seen a considerable number of young women who have had their ovaries removed for *dysmenorrhœa ;* there was no reason for the operation.'*

* *New York Journal of Gynæcology and Obstetrics*, August, 1893 ; p. 728.

Salpingo-Oöphorectomy.

To perform salpingo-oöphorectomy, we proceed as follows Every preliminary precaution having been taken similar to those enumerated for the operation of cœliotomy, the patient is placed on a table about five feet long by two wide, opposite a good light, and anæsthetized. One of those tables capable of being utilized for the Trendelenburg position is preferable. The abdominal wall should be thoroughly cleansed before operation, and all other precautions are taken with regard to scrupulous cleanliness in assistants, fingers, instruments, and sponges. The incision, about an inch and a half long, is made in the middle line, and sufficiently large to admit the fore and middle fingers of the left hand. It is necessary occasionally to enlarge this incision, especially in the instance of myomata, and to use retractors to hold the margins of the wound well aside. (Figs. 324, 325.) The preliminary steps are the same as in cœliotomy, both as regards the control of all bleeding-points before opening the peritoneum, and in the subsequent careful division of it. If the omentum be adherent, it has to be cautiously and gently peeled off. The fundus of the uterus will guide the finger to the broad ligament, Fallopian tube, and ovary. The Fallopian tube may be distended with fluid, and a small aspirator may have to be used to draw this carefully off. The escape of fluid has to be guarded against with a sponge. It is well to have two or three flat sponges of different sizes ready to hand for use in protecting the peritoneum and intestine. The ovary having been drawn into the wound, the edges of which are depressed by an assistant by a long pressure-forceps (Figs. 328, 452), though in most uncomplicated cases no forceps is required, the Fallopian tube is well exposed. A loop of double ligature is passed through the centre of the broad ligament, avoiding the vessels. The loop is then turned back so as to include both the ovary and tube in the two loops thus formed. One free end is next passed through the returned loop, both ends are now drawn tightly, tied, and then

cut off (the Staffordshire knot). (See chapter on Sutures, p. 425.) The ovary and tube can now be removed, cutting neither too close to, nor too far from, the ligature. The stump is dropped back into the cavity. Any fluid or blood is thoroughly removed by careful sponging, especially from the pouch of Douglas. The abdominal toilet is then made. A drainage-tube (Keith's or Tait's) should be used if the peritoneal cavity has been washed out. Tait uses a continuous, which is cut subsequently to convert it into an interrupted, suture. Both ovaries and tubes are, as a rule, removed.

Recent vexatious litigation has taught the lesson that the surgeon's best course is to be explicit on this subject with the patient, and to *have it clearly understood before operation that if the two ovaries are unhealthy, or that for any cause it is thought right to remove both annexa, the surgeon is at liberty without future question to do so.* Otherwise he may lay himself open to most unjust and annoying attacks.

Simple as this operation is in the majority of cases, it becomes quite a different matter if the surgeon has to deal with unexpected difficulties in the pelvis. There may be displacement of the annexa through the presence of a uterine or intra-ligamentary fibroid. Also, adhesions most difficult to detach may be encountered. Again, there may be found a cyst distended with serum, blood, or pus, to the point of rupture, and this, again, may be fixed by adhesion to the bladder or bowel. The safe rules to adopt are, to avoid all hurry, to deal carefully with adhesions, to ligature or control by forceps the bleeding as we proceed, and to safeguard the operation by the most thorough antisepsis.

I may here repeat what I have elsewhere stated in regard to operative procedures on the pelvic viscera and the ever-varying and complex conditions found on opening the abdomen. They admit practically of no fixed rule in dealing with them. The true surgical artist is he who, while conforming to broad and unalterable surgical principles, deals with each case and its complications as it presents itself to him at the time of

operation, his resources limited by no rigid theoretical consideration, and his hand not held by any authoritative *ipse dixit.* Through such freedom of action can we alone hope for progress, and in no part of the human body is such liberty demanded more than it is in the surgery of the female organs of generation. It were well to bear this in mind in discussions, often futile, on this or that method of procedure, and in disputations over steps of operations, the bearings of which, in actual practice, when face to face with unexpected and novel difficulties, vanish, and where the surgeon has to fall back on his individual judgment and surgical instinct for guidance.

Perineotomy.

Hégar has performed perineotomy by means of an incision through the ischio-rectal space, and Sänger, in the same

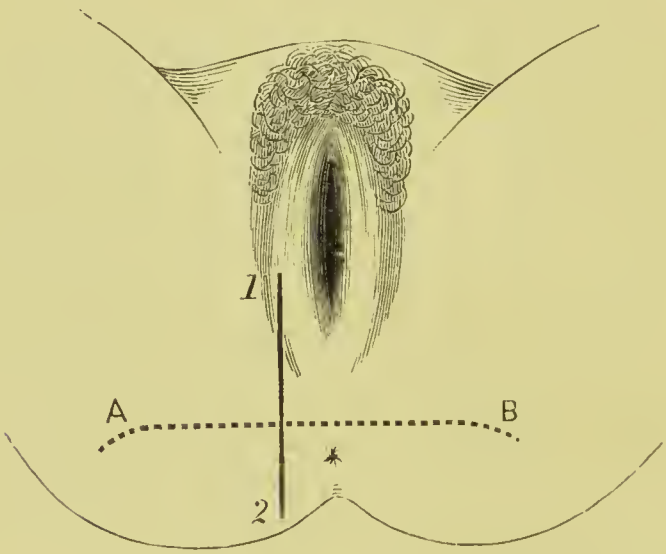


Fig. 419.—Incisions of Sänger for Vertical, and O. Zuckerkandl for Transverse, Perineotomy.

fashion, carries a deep incision from the side of the vulva vertically backwards to the margin of the buttock, a few centimetres behind the anus, and midway between it and the tuberosity of the ischium. Otto Zuckerkandl, on the other hand,

has reached collections in Douglas' pouch by deep transverse incision carried midway between the anus and the fourchette, exposing the levator ani and the ischio-rectal fossa. In this manner, by both methods, in certain cases pelvic abscess has been reached and evacuated.

Alternatives of Salpingo-Oöphorectomy.

Conservative Operative Steps.

I am indebted to Charles Routh,* the veteran gynæcologist, for this summary of the different operative procedures adopted by various surgeons for preserving the appendages.

Partial Amputation and Resection of the Tubes.

With regard to partial extirpation, (*a*) Polk advises partial resection of tubes and of ovaries, and cutting or tearing adhesions, and replacing portions so treated within the abdomen. (*b*) Barrows recommends partial amputation of tubes, and returning the healthy part in the abdomen.

By resection or amputation of the tubes Barrows means the cutting off of the diseased abdominal end of the tube, not the removal of a portion of the wall of the tube, the apparently healthy portion being returned to the pelvic cavity. In certain cases of pyo-salpingitis, the tube may be amputated at some distance from the cornu of the uterus, and the formation of an artificial ostium abdominali may be so completed.

In some instances he has noted the tube which contains the pus is closed, firstly, at the extreme end of the infundibulum by adhesions with surrounding parts, ovaries, intestines, etc. ; but, secondly, it is also closed at a point about half an inch to an inch or more in length from the uterine cornu. It is in this sac that the pus accumulates. In the inner portion of the tube the aperture is patent, and any pus there formed is discharged by the uterus ; but far more frequently neither the mucous, serous, nor muscular coats of this portion are inflamed. It is in these cases where we have a healthy ovary, and that the fimbriated extremity of the tube is not adherent to it, that he amputates the healthy portion of the tube, washes it and slits it up a little way, and unites

* 'Conservative Treatment of the Uterine Appendages,' by Charles F. Routh, *British Gynæcological Journal*, May, 1894.

the serous and mucous coats of it by fine catgut ligatures, bringing the new ostium thus formed in close apposition to the ovary. The uterus may thus be curetted and filled with the gauze ; all painful symptoms disappear even during menstruation.

Pozzi insists that in hydro-salpinx, with relative integrity of the ovary, cysts only the size of a pea, or an intact and permeable tube with diffuse ovaritis sclerosis, or limited longer cysts, or microcystic degeneration, conservatism may be adopted. In the first case partial resection of the ovary may be done. In the second we may perform salpingostomy, *i.e.*, re-establishing an ostium by partial resection of the Fallopian tube.

Polk recommends retention of the tubes in thickening after acute inflammation, unless the uterus be the cause. If so, the uterus must be at once cleansed, curetted, and packed with gauze. If the tube be not distended, and is closed by recent lymph, he opens it, approximates the outer and inner coats, washes it out with plain water, and returns it to the pelvis ; but he removes all tubes distended with muco-pus, blood, or sero-fluid, even to the very *cornua uteri*.

The general rule Pozzi gives is, that wherever the Fallopian tube is healthy, and the ovary alone diseased, we must endeavour to preserve a part of the latter, and only at the last extremity resign ourselves to a total extirpation.

Salpingostraphy.—Pozzi, having first ascertained that the tube is perfectly permeable by a stylet passed down to the uterine cavity, seizes the ovary, and removes a piece of it by a cuneiform section. The parts are brought together by catgut sutures. If the ovary is affected with microcystic degeneration, and any portion of it is not so affected, it is spared, and the diseased portion alone removed, then the ostium of the Fallopian tube is fixed upon the ovarium stump by a few points of suture, *salpingostraphy*, and thus placed in position to receive the ova. Lately Pozzi opens all these small cysts by the knife, or actual cautery, which in itself often causes an energetic melting away of the chronic inflammations.

Salpingorrhaphy.—Pozzi has practised salpingorrhaphy, or suture of the Fallopian tube to the uterine stump, which he has also done in some broken adhesion cases.

Dentu states that in most, if not all, cases of *hydro-salpinx* the opening with the uterus is patent. Indeed, the very symptoms of the disease, recurring from time to time, especially when the patient has caught cold, or as a sequence of endometritis, and when, as generally believed, the dropping of some of the secretion into the peritoneum gives rise to slight peritonitis, is proof of this patency, on the uterine side from whence came the recurring inflammation. Clearly, therefore, as in its earlier stages, and even sometimes later, you cannot,

unless you perform abdominal section, know whether it is a case of hydro-salpinx or pyo-salpinx; the indication is to treat the case *per vias uterinas*, as if it were the former.

A. Martin resects a stenosed tube, the other being removed for disease. Here it may be more difficult to recognise the character of the disease. The contents of the tube must be carefully examined; if they are turbid or unmistakably purulent, or if the mucous membrane be ulcerated, the tube must be removed, otherwise resection with the formation of a new ostium may be practised. If any doubt exists, the whole appendix should be removed.

In the first class of cases there was a mortality of 3·7 per cent., and in the second class of 5 per cent.

Collateral Treatment of the Uterus.

Barlow insists upon a more conservative treatment, and one founded on the *fons et origo* of its pathology.*

In cases of extension of some inflammatory condition of the uterus, or its lining membrane, Polk advises curetting and firm packing of the cavity with gauze. This cures at once not a few cases of salpingitis.†

Barrows adopts the same plan, either before or at the time of cœliotomy, as it is quite possible and more convenient to perform these two operations synchronously. Indeed, he states that he has on more than one occasion curetted, packed the uterus, repaired lacerations of the cervix and perinæum, and resected the tubes and ovaries at the same sitting, all within one hour, thus avoiding a second etherization.

Resection of the Ovaries.

Polk generally removes the ovaries if they are sufficiently diseased. As a rule he removes both ovary and tube. But should the ovary also be removed with the tube, if the tube only is diseased? Polk replies in the negative. He says remove the tube, but leave the ovary, even if the case be one of pyo-, hæmato-, or hydro-salpinx. He quotes cases so operated on, and with good results, one becoming pregnant subsequently.

Adhesions.—If adhesions imprison the ovaries and tubes, they will destroy their functions. If the adhesions can therefore be cut, or torn away safely, this should be done, and the organs will regain their integrity in many cases.

Nature of Operation.—While the ovary is merely the seat of small cysts, *ignipuncture* with a fine cautery point is the best procedure, or with larger cysts enucleation and subsequent cutting away portions by a V-shaped incision. In the removal of a tube, or a portion of it, act as you would in a case of removal of a portion of intestine, etc.

Polk had operated in some one or other of these conservative ways in eighty cases, and these cases were for the most part again seen after periods of six months or two years, and he states that in all, except seven, excellent therapeutic results were obtained.

Pozzi advises partial resection of diseased parts of the ovary, the cut edges being brought together, if healthy, and stitched, or ignipuncture of the ovary,

* *American Journal of Obstetrics* for December, 1893.

† *Ibid.* for February, 1892.

if cystic, fixing the ostium of the tube to the ovary. Martin also suggests resection of the ovary in like manner, but without ignipuncture and resection of the diseased part of the tube and formation of a new ostium. Salpingotomy as taught by Skutch, *i.e.*, a small piece of the tube removed and the parts brought together in cases of hydro-salpinx.

In all these modes of operation abdominal section must be performed.

A. Martin resects the ovary. Usually bilaterally diseased, yet sometimes only circumscribed cystic disease may be found in the other ovary. Under these circumstances, should the entire ovary be removed? His answer is in the affirmative, if there be no healthy tissue left, and if the process be suppurative; but not in some other cases. Martin had no unfavourable results. He is satisfied with incision and stitching up.

Several women on whom he practised conservative operations on the ovary recovered, were cured, or immensely improved. In each case menstruation recurred, and one became pregnant.

Importance of Early Operation.—I cannot improve on the observation of C. F. Noble in his report of two years' work in the Kensington Hospital, Philadelphia, during which time he performed ninety-seven cœliotomies, and two that were done by Dr. Applebach, ninety-nine in all. There were five deaths.

'Here the rule has been followed to operate for disease only, and almost without exception the patients were suffering from gross lesions; there will, therefore, be no future regrets because of the removal of organs not hopelessly diseased. The operations were done because the women were invalids and incurable otherwise, or else to save them from impending death.'

'It is still,' he says, 'necessary to urge upon the profession the necessity of early operation in cases of serious disease of the pelvic and abdominal organs. The old policy of palliation and delay until the disease was approaching a fatal termination, before resorting to operation, is still claiming its many victims. This policy is the cause of most of the deaths in the hands of abdominal surgeons, and also of most of the partial successes which follow operations. The profession has at last accepted the teaching that delay is worse than bad in the treatment of ovarian tumours, and now it is universally conceded that cases of ovarian tumour should be submitted to operation so soon as a diagnosis is made. Tapping and all other forms of palliative treatment have fallen into deserved disrepute.

CHAPTER XXXIV.

AFFECTIONS OF THE OVARIES (continued).

The Correlation of Sexual Function and Insanity.

The relation of disordered sexual functions to mental disease has hardly received the careful attention on the part of the profession generally that it most decidedly demands. In several portions of this work the correlation of sexual disturbance and disease in the organs of generation, or some error in function, has been incidentally referred to (chapters on Menstruation, Menstrual Disorders, Uterine Reflexes, etc.). The most frequently associated morbid psychical conditions are aggravated hysteria, various forms of dementia, phases of melancholia, suicidal tendencies, climacteric mania. The important question is, how far is such alienation due to, or the cause of, the sexual aberration? There can be no doubt that perverted or suppressed menstrual functions at any time of the active physiological life of the ovary, but more especially from puberty to womanhood, and during or approaching the menopause, does lead up to insane impulses, delusions, and illusions. Short of such, we have every form of hysteria, instability of purpose, mental incoherence, and depression bordering upon true melancholia. But, looking at the question from the other point of view, we have equally to remember that the healthy discharge of the sexual function is frequently interfered with by mental causes that arrest and suppress those functions, or have preceded the sexual irregularities or

the onset of disease in the generative organs. If we ask what are the affections of women that experience shows are more frequently present in the mentally afflicted, they are:

Amenorrhœa.
Dysmenorrhœa.
Ovaritis.
Diseased states of the annexa.
Stenosis of the uterine canal.
Retroflexion.
Tumours of the uterus.
The effects generally of masturbation.

In the discussion on this subject in the Gynæcological Society of Great Britain (October, 1890), there appeared to be an agreement with the view of Savage, that 'a relatively small amount of success followed examination of the pelvic organs in women.' Hack Tuke recognised the coincidence of disordered menstruation and disturbance of the mental functions, and *vice versâ*. He referred to the negative results which followed interference in American asylums; the net 'results of several years' experience were extremely meagre.' Tuke entered specially into the question of oöphorectomy, and indicated that there might be cases in which its performance would be justifiable. Percy Smith, of Bethlehem Hospital, thought that amenorrhœa was only a symptom of the general disorder in acute insanity. He generally deprecated interference with the uterus or appendages, an opinion coincided in by Lankford of Virginia. Wilks advocated, in these cases of nervous disturbance associated with uterine affection, attention to the general condition rather than to the local one.

The remarks of Robert Barnes, who introduced the discussion, tended to establish the proposition '*that in cases of nervous derangement, in which disorder of the sexual functions is suspected, a close investigation of the state of the sexual organs should be made.*' The experience of Lawson Tait on the one hand, and Sir Spencer Wells and Keith on the other, were conflicting as to the possibility or probability of oöphorectomy predisposing to insanity. Tait had no case of insanity in his practice; on the contrary, he had relieved patients suffering from mental alienation by operation; Sir Spencer Wells had had two cases arising after ovariotomy, and he had seen patients *almost* melancholic after removal of the ovaries; Savage of Birmingham had records of four cases of insanity out of 483 cases of removal of the appendages of both sides; and Keith, out of sixty-four hysterectomies with removal of the ovaries, had six cases of insanity. Bantock's experience agreed entirely with that of Tait. He instanced a case in which the connection between ovarian disease and mental disturbance was clear and indisputable. R. T. Smith instanced a case of cure of hystero-epilepsy by oöphorectomy.

I then expressed the opinion that, while no one could doubt the association existing between certain minor conditions of mental disturbance and

LEEDS & WEST RIDING

MEDICO-CHIRURGICAL SOCIETY

disease of the sexual organs, I had only rarely been able to directly trace any relation as of *cause and effect* between true insanity and such disease. I instanced two striking exceptions to this rule—one in which the delusion arose in connection with a fibroid tumour of the uterus, and in the other in consequence of retroflexion of the uterus and enlarged ovaries. Both were examples of what Barnes termed 'an antecedent nervous condition as a predisposing factor.' An interesting point was alluded to by Savage, viz., the occurrence of hallucinations of smell as an early symptom to be looked for in such cases, one instance of which was quoted by the author.

Sir Spencer Wells' opinion may be gathered from these words:

'No one can pique himself upon the outcome of oöphorectomy for mental aberration. A few melancholy girls, worn out by long suffering, and driven to think of the river by disappointment at the abortiveness of doctoring, may have laughed and found life tolerable afterwards, for women are not morally affected by castration as eunuchs. But cure madness—no; gynæcologists will never empty the lunatic asylums. They have sent some women into them.'*

The Medico-legal Relations of Disordered Menstruation.

Macan† quotes Kraft Ebbing as follows:

'(1) The mental condition of a woman during her menstrual period should be taken into account in medico-legal investigation. (2) That is to say, inquiry should be made as to whether any criminal act committed by a woman has coincided with her menstrual period—and by period should be understood not only the days during which the discharge (flux) takes place, but those also which immediately precede and follow it. (3) The examination of the mental condition is the more necessary—whenever any such coincidence has been once noticed—especially if this should have been preceded by moral or nervous disturbance, or peculiarity in behaviour at the menstrual period. (4) If menstruation have evidently had a distinct influence upon the ideation of the accused, that fact should be admitted as an extenuating circumstance in deciding the punishment even where there is no absolute proof of menstrual insanity. (5) If the crime have

* There can be no doubt that the general belief is that, independently of any collateral effect from the anæsthetic, there is a greater liability to mental disturbance in women after operations on the generative organs than after any other class of operative procedure.

† *British Gynæcological Journal*, May, 1895.

been committed during a menstrual period by a woman who, during such period, had been affected by mental disturbances —and the act be of an impulsive character—the accused should be deemed irresponsible. (6) Accused persons absolved on the ground of menstrual insanity as dangerous, should be submitted to strict surveillance during menstruation, or, preferably, confined in an asylum, where, besides being well looked after, they might perhaps be cured of their mental disturbance.'

Some valuable statistics bearing on the entire subject have been collected by Rohé,* extending over four years, in the Maryland Hospital. He is in favour of surgical interference by special permission in every case in which diseased local conditions are shown to be present. According to Rohé, the vaginal examination does no harm. L. Napier, commenting on Rohé's deductions, says:

'If it is true that pelvic disease is prevalent among insane women (an assertion easily confirmed or refuted by further observation), the question arises, Has the pelvic disease any etiologic relation to the mental disturbance? Upon this point, much more extended clinical observation is desirable. The mere coexistence of pelvic disease and insanity in women does not establish a causative relationship. The cure of the mental disturbance by removing the physical disease would generally be accepted as a sufficient test. Unfortunately, a cure of the mental derangement does not always follow removal of the local disease. There are abundant reasons for this. The brain organization may have already been so much deteriorated by the persistent reflex irritation from the local disease, that local cure fails to restore the normal brain power. The habit of morbid action of the brain may have been so strongly impressed upon that organ that the original cause of the derangement is no longer necessary to keep it up.'†

Mary Dixon Jones, referring to oöphorectomy for *diseased* ovaries and tubes in the case of women so affected who are insane, or mentally afflicted, having instanced some such cases, says: 'I would not remove healthy or normal ovaries for dysmenorrhœa or any suffering in the regions of the ovaries; I would not remove them for epilepsy, nor for mental or neurotic disease, even if I had failed after long trials of tenta-

* *Jour. Amer. Med. Ass.*, October, 1895.

† *Brit. Gyn. Jour.*, November, 1895.

tive measures, and had the cordial, full, and deliberate sanction of experienced practitioners, *unless* I believed the *appendages* themselves *were diseased.*'

I have said sufficient to show :

1. That the correlation of insanity and disordered sexual functions arising out of affections of the generative organs is a factor to be taken into serious consideration in the treatment of the mentally afflicted.

2. That where there is ground for the suspicion that some physical condition of the uterus or annexa exists that may produce or aggravate the mental affection, a careful examination, under an anæsthetic if necessary, should be made.

3. That in the investigation of criminal acts committed by women, either during the menopause or while the menstrual function is either active or suppressed, due weight should be given to the influence exerted by its irregularity or abeyance on the mind of the woman. In doing this, her previous history and temperament should be considered.

4. That the special dangers of the climacteric period should be remembered, and the symptoms indicative of threatening climacteric mania recollected. The principal of these are moroseness and depression of spirits, attacks of hysteria, occasional hallucinations of sight and hearing (especially of smell), delusions with regard to relations, unjust dislikes, unfounded apprehensions of some great crime committed or injury inflicted on them, suicidal tendencies.

5. That in operations on the female generative organs there is a greater predisposition to mental disturbance than after other operative procedures.

Under all such conditions, and in the face of these warnings, the greatest supervision and care of the patient are required to anticipate the insane impulse, and to prevent suicide or crime.

CHAPTER XXXV.

CLASSIFICATION AND PATHOLOGY OF TUMOURS, DERMOIDS, AND CYSTS OF THE OVARY, PAR-OVARIUM, AND GARTNERIAN DUCT.

Tumours.—The ovary is liable to the following genera of tumours : (1) Fibromata ; (2) Myomata ; (3) Sarcomata ; (4) Carcinomata.

1. *Fibromata.*—Tumours composed entirely of firm fibrous tissue have been observed ; some examples have attained a weight of ten pounds. Ovarian fibromata are very rare. Many specimens described as such have turned out on subsequent re-examination to be typical spindle-celled sarcomata.

2. *Myomata.*—Tumours composed of unstriped muscle tissue are very rare in the ovary. Undoubted examples have been observed and described by competent histologists, and the subsequent courses of the cases have justified the histological interpretation. Some of these tumours have reached formidable dimensions, and to the naked eye, as well as in minute structure, were indistinguishable from uterine myomata.

3. *Sarcomata.*—The ovary (like the testis, kidney, and retina) is prone to become the seat of sarcoma in early life ; to this succeeds a period of comparative immunity, followed by a second period of renewed but diminished liability.

The sarcomata (oöphoromata) of infant life attack both

ovaries in more than half the cases; they grow rapidly, attain formidable proportions, and quickly destroy life.

Structurally they consist of round or spindle cells, in which collections of cells are often conspicuous, resembling the alveolar disposition characteristic of cancer. These supposed cancerous alveoli are ovarian follicles entangled in the general overgrowth of the ovarian stroma.

The first period of exceptional liability ends at puberty; ovarian sarcomata are very rare from the sixteenth to the

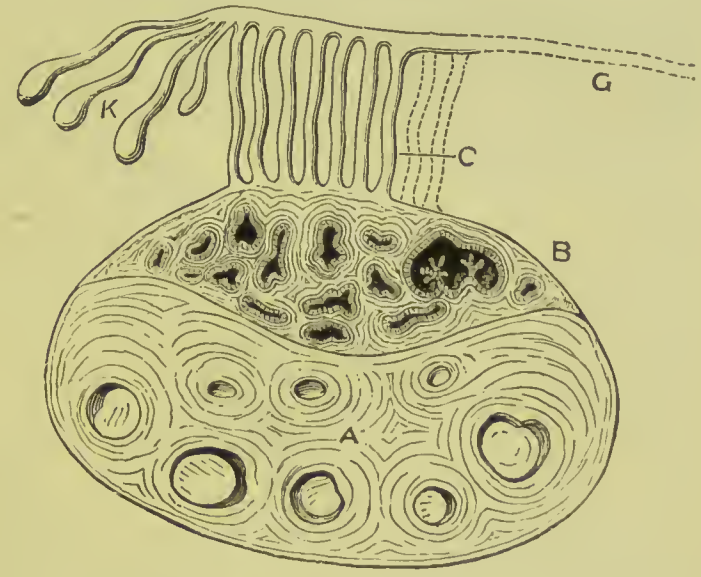


FIG. 420.—A Diagram representing what may be called the Cyst Regions of the Human Ovary. A, Oöphoron; B, Paroöphoron; C, Parovarium, with K, Kobelt's Tubes, and G, Gartner's Duct (Bland Sutton).

twenty-fifth year. From this age to forty-five they are occasionally met with, and are in most cases unilateral. Like sarcomata during the infancy period, they grow quickly, and rapidly destroy life. At both periods ascites accompanies the late stages.

4. *Carcinoma.*—Many tumours of the ovaries described as primary cancers are sarcomata. The alveolar disposition of cancer is imitated by ovarian follicles being entangled among the cells of the tumour. Primary ovarian cancer requires

further investigation. Cancer of the ovary, secondary to mammary and uterine cancer, is common enough.

Dermoids and Cysts.—It is necessary to remind the student that the ovary consists of an egg-bearing portion, the *oöphoron*, and a region, the *paroöphoron*, in which no ova are found (Fig. 420).

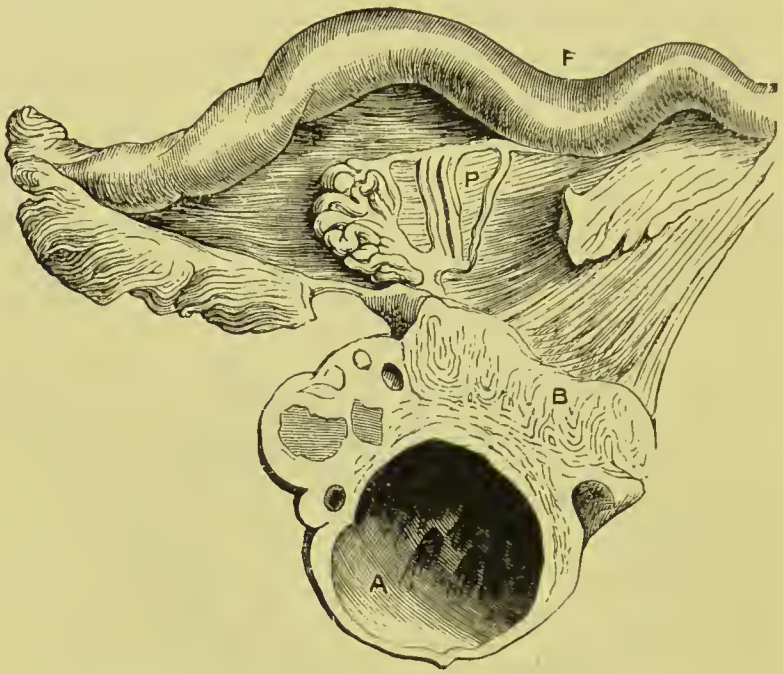


FIG. 421.—An Incipient Oöphoronic Cyst. A, Oöphoron; B, Paroöphoron; P, Parovarium; F, Fallopian Tube (Bland Sutton).

The Oöphoron.—This part of the ovary is the source of three varieties of tumours:

1. Simple Cysts.
2. Adenomata.
3. Dermoids.

Simple Cysts.—These may be unilocular or multilocular. When the cysts are large it is difficult to demonstrate an epithelial lining on the interior, but in their earliest stages they possess a membrana granulosa (Fig. 421). In carefully preserved and skilfully prepared sections of ovarian follicles, it has been demonstrated that the lining epithelium is often

columnar or subcolumnar. Simple oöphoronic cysts arise from ovarian follicles, and as the cyst enlarges, the epithelium, submitted to pressure, gradually stratifies, and finally disappears. In an oöphoronic cyst the size of a melon, stratified epithelium may be sometimes demonstrated; in very large

FIG. 422.—Portion of a Multilocular Ovarian Cyst—Adenoma—showing the varieties of loculi: *c*, primary, *d*, secondary (Bland Sutton).

cysts, with a capacity of one or more gallons, the walls consist of fibrous tissue only.

Ovarian Adenomata.—These are often referred to as 'multilocular semi-solid ovarian tumours.' They possess a fibrous

capsule through which distended loculi protrude and produce a lobulated surface. On section an ovarian adenoma displays a honeycomb appearance (Fig. 422), the loculi varying greatly in size. Some of the loculi may not exceed 1 cm. in diameter, whilst others are even larger than melons.

The cavities are filled with viscid tenacious mucus secreted by the glands which beset the lining membrane of the loculi

FIG. 423.—Magnified Section of an Ovarian Cyst, containing mucous membrane and mucous glands (Bland Sutton).

(Fig. 423). The epithelium in many of these tumours is of the tall columnar variety.

Ovarian adenomata frequently grow to prodigious sizes, and have been known to weigh over one hundred pounds.

Dermoids.—A very large proportion of oöphoronic cysts contain skin or mucous membrane, or both these structures, and some of the many organs peculiar to them, such as hair, sebaceous, sweat, and mucous glands, dermal bone, horn,

nipples, and even mammary glands (Fig. 424). Teeth often occur, occasionally in enormous numbers ; three hundred, and even four hundred, have been counted in one dermoid.

The degree of development of the dermal structures varies greatly; sometimes hair predominates, in another teeth, and in others mucous or sebaceous glands. In very complex multilocular dermoids some of the loculi are full of glands, others are stuffed with sebaceous material, shed hair, and epithelium. Rarely the hair forms a nucleus for the shed

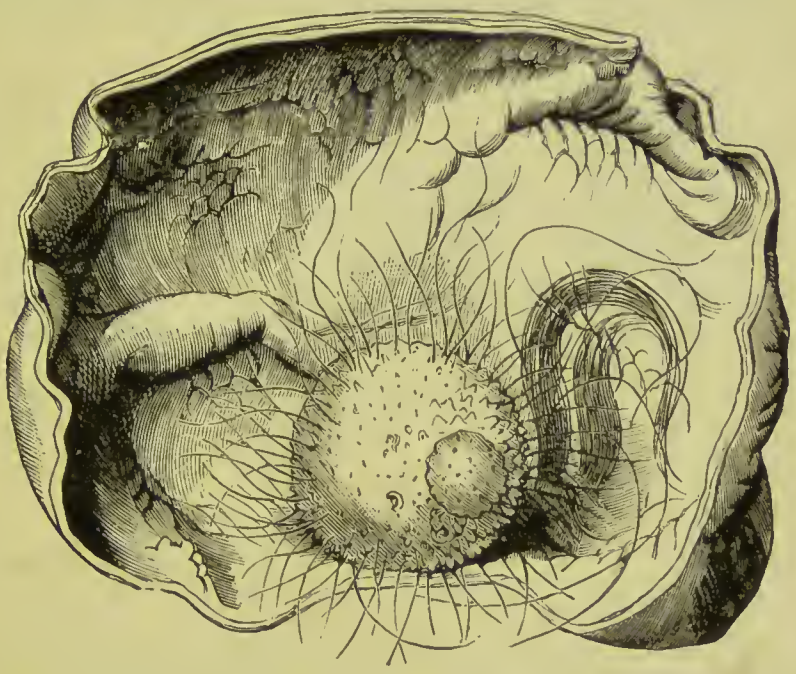


FIG. 424.—An Ovarian Dermoid with a spurious mamma and nipple growing from its wall (Museum, Royal College of Surgeons—Bland Sutton).

epidermis, which by the movements of the tumour become rolled into 'epithelial pills.' As many as four thousand little balls of the size of green peas have been found in one dermoid (Walter). More commonly the débris in the loculi and larger cavities of dermoids consists of a pultaceous mass mixed with shed hairs. Unilocular dermoids never reach to such large proportions as simple oöphoronic cysts ; the multilocular specimens have been known to weigh thirty, and even fifty, pounds, but such large dermoids are exceptional.

It is very important to remember that in the three varieties of oöphoronic cysts here described there are no hard and fast distinctions, and it is not uncommon to find a simple cyst combined with an adenoma or a dermoid. A combination of an ovarian adenoma and a dermoid is quite common. It is also important to mention that all the varieties arise in the ovarian follicles. Cysts of the oöphoron occur at all ages, from fœtal life up to the extreme limits of human life, for they have been noted in women of eighty-four years; but there is no satisfactory evidence of an ovarian dermoid having been observed before the end of the first year of life.

It is important to emphasize the fact that all varieties of oöphoronic cysts are innocent. Here and there statements have been made that ovarian dermoids have recurred after removal, but the evidence breaks down on critical inquiry. The suspected examples of dissemination of dermoids receive a very satisfactory explanation now that it is known that the secondary dermoids are due to rupture of the primary tumour and transplantation of its epithelial elements.

Cysts of the Paroöphoron (*Papillomatous Cysts*).—These are distinguished by the following characters: Usually they are sessile, and do not affect the shape of the ovary until they have attained a large size. Unlike oöphoronic cysts, they make their way between the layers of the broad ligament. As a rule they are unilocular, contain clear fluid, and the interior is not infrequently beset with papillomatous masses. Occasionally the wart-like processes crowd the interior of the cyst. These warts are very vascular, bleed freely when handled, and sometimes calcify. Such cysts may rupture, and the contents be disseminated through the peritoneal cavity. Portions of the warts may engraft themselves on the peritoneum and grow into independent warts.

In their early stages such cysts resemble, in their relation to the broad ligament, those arising in the parovarium; but when they attain a large size they burrow very deeply between its layers. When this occurs the ovary suffers, and it is very

difficult and often impossible to find a remnant of this organ.

Coblenz seems to have been the first to clearly identify and distinguish these cysts from ovarian and parovarian cysts, and to associate them with definite structures.

When these cysts give rise to epithelial infection, hydroperitoneum occurs, and the fluid re-accumulates after tapping. When the cyst is removed, the warts rapidly disappear from the peritoneum, and fluid no longer collects in the belly.

FIG. 425.—A Cyst of the Parovarium, showing its relation to Ovary and Tube. A, Oöphoron; B, Paroöphoron; F, Fallopian Tube (Bland Sutton).

Papillomatous cysts are usually met with between the twenty-fifth and fiftieth years.

Gartnerian Cysts.—It has long been recognised that certain cysts of the vagina arise in connection with the terminal segment of Gartner's duct. When these cysts are very large they burrow between the layers of the broad ligament. There is good reason to believe that some papillomatous cysts of the broad ligament, usually ascribed to the paroöphoron, arise in the middle segment of a persistent Gartner's duct, especially those examples which burrow close beside the uterus.

Cysts of the Parovarium.—This species of cyst arises in the vertical tubes of this curious structure (Fig. 425), and lies

between the layers of the mesosalpinx, and has the Fallopian tube stretched across its crown (Fig. 426). Parovarian cysts are lined with columnar ciliated, simple columnar, or squamous epithelium; in large cysts the epithelium atrophies, from pressure. When these cysts are immersed in strong alcohol, they quickly lose their transparency: this is due to a flaky deposit from the fluid; in parovarian and some ovarian cysts it is present in very large proportion.

Parovarian cysts vary greatly; in some specimens they are as small as peas; usually they rival a large orange in size; now and then undoubted parovarian cysts are met with holding several pints of fluid. In these large cysts the walls thicken, lose their transparency, and become very tough. The overlying layers of the broad ligament also become thickened.

Very many cysts removed by the early ovariotomists, which stand in their lists as simple unilocular ovarian cysts, were of parovarian origin. In comprehensive ovariotomy statistics they form about ten per cent. of the total.

There is no reliable account of a parovarian cyst before puberty.

Ovarian Hydroceles.—Although the Fallopian tube does not communicate with the interior of an ovarian or parovarian cyst, nevertheless there is a variety of cyst, usually called tubo-ovarian, distinguished from other forms of cysts connected with the ovary, by the fact that the abdominal ostium of the tube is directly continuous with the walls of a cyst replacing, or occupying, the position of the ovary. The term 'tubo-ovarian cyst' includes two varieties of cysts, one due to congenital causes, and the other arising from inflammatory changes; it will be more appropriate to call the former 'ovarian hydrocele,' especially as it arises from distension with fluid of a peritoneal tunic which occasionally surrounds the ovary, much in the same way that the tunica vaginalis invests the testis. A typical specimen is shown in Fig. 426.

The chief peculiarities of these rare cysts are as follows:

The tube and cyst resemble a retort with a convoluted

delivery tube. The tube opens into the cyst with a wide orifice, which in some specimens is surrounded by fimbriæ. The cyst projects on the posterior aspect of the broad ligament, and, when small, the ovary will be found projecting into its floor. When the cyst is large, the ovary becomes flattened out, and finally atrophies. Ovarian hydroceles are very rare.

Care is necessary to avoid confusing a large hydrosalpinx with an ovarian hydrocele or a tubo-ovarian cyst. The position

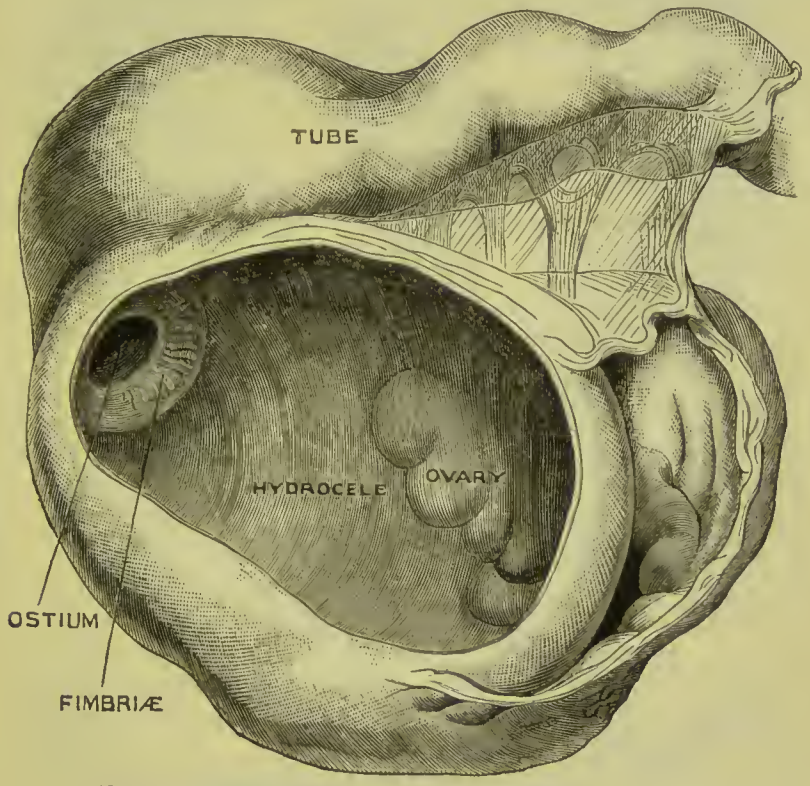


FIG. 426.—An Ovarian Hydrocele (Bland Sutton).

of the ovary will prevent this error, for in hydrosalpinx it lies clear of the cyst, and usually occupies the concavity formed by the bent but distended tube.

Secondary Changes.—Ovarian cysts, using the term in a broad clinical sense to include the various species described in this section, are liable to three important changes: (1) Rupture; (2) Axial rotation; (3) Suppuration.

Rupture.—When parovarian cysts rupture, the bland fluid

causes no offence to the peritoneum, and is quickly absorbed; copious diuresis ensues, and then in most instances the cyst slowly refills.

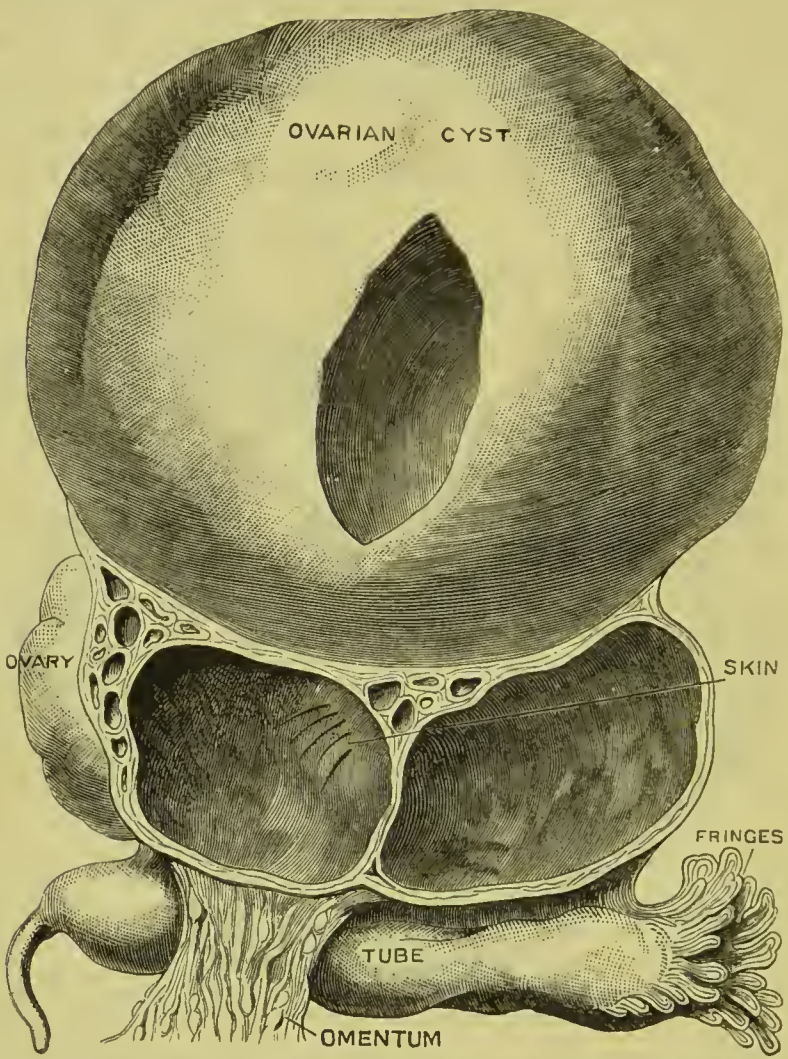


FIG. 427.—A Multilocular Ovarian Cyst which has been detached from the uterus in consequence of axial rotation. Its vitality was maintained by adhesions to the great omentum (Bland Sutton).

The effects of the diffusion of the contents of a paroöphoronic cyst have already been detailed.

When oöphoronic cysts rupture, the effects depend on the nature of the cyst-contents. Simple fluid is rapidly absorbed

and excreted. Viscid fluid is retained in the belly, and in time produces a peculiar thickening of the peritoneum and omentum.

The diffusion of the epithelial débris of a dermoid may lead to the formation of numerous small or secondary dermoids on the mesentery, omentum, among intestinal adhesions, or even on the under surface of the liver.

Axial Rotation.—Ovarian cysts and tumours, in common with many pedunculated abdominal tumours, are liable to rotate on their axes, a movement which leads to torsion of the pedicle and interference with the circulation of the tumour. When the torsion is acute, severe pain and venous engorgement are the usual effects. When rotation takes place slowly, it will sometimes so completely arrest the venous and arterial current that the cyst shrivels. In a small proportion of cases the life of the tumour is preserved in consequence of adhesions to surrounding tissues, especially omentum. When this happens, the original connections of the cyst with the uterus may gradually disappear, and its nutrition is derived from the omentum by the new vessels developed in the adhesions. When an operation is practised for the removal of such a tumour, the surgeon is surprised to find an ovarian tumour with a Fallopian tube hanging from the omentum, and unconnected with the uterus or broad ligament except perhaps by a narrow strand of tissue (Fig. 427).

Suppuration.—When air, or intestinal contents or gas, gains access to ovarian tumours, suppuration and all its attendant evils are the results. Contamination may arise from punctures with trocars or aspirating-needles. When suppuration occurs, the pus may find an outlet through the bladder, rectum, or vagina. Sometimes a sinus forms in the anterior abdominal wall, especially in the neighbourhood of the umbilicus. Ovarian dermoids are very liable to suppurate.

Cases of Associated Parovarian and Vaginal Cysts, formed from a Distended Gartner's Duct.

Amand Routh has detailed cases of the above, and also of two analogous cases of patency of the whole length of the duct, with an anterior opening

allowing free discharge, and thus preventing distension of the duct along its course.

He compares such cases and those of distended but imperforate Müller's ducts.

The following propositions are put forward:

1. That Gartner's duct can be traced in some cases in the adult female from the parovarium to the vestibulum vulvæ, ending just beneath and slightly to one side of the urethral orifice.

2. Homology tends to show that Max Schüller's glands are diverticula of Gartner's ducts, just as the vesiculæ seminales are diverticula of the vasa deferentia. Some evidence is given that Skene's ducts are not necessarily identical with the anterior termination of Gartner's ducts (as most of those who have traced Gartner's duct to the vestibule have thought), but that Skene's ducts lead directly and solely from Max Schüller's urethral glands, Gartner's ducts being continued to the vestibule, behind, but parallel to, Skene's ducts.

3. That Gartner's duct, if patent, may become distended at any part of its course, constituting a variety of parovarian cyst if the distension be in the broad ligament portion, and a vaginal cyst if the distension be in the vaginal portion. The cases described are instances of the association of both of these cysts, owing to simultaneous patency and distension of both portions of the duct.

Attention is drawn by Routh to these cases as affording explanations of some obscure cases of profuse watery discharge from the vagina, not coming from the uterus or bladder.

The question of treatment is also approached, and the opinion is expressed that where the whole duct is distended the vaginal part of the cyst may be laid open as far as the base of the broad ligament, and the broad ligament portion encouraged to contract and close up.

The cases are examples of a condition probably very rare, namely, a vaginal cyst communicating with a cyst between the layers of the broad ligament, and the explanation offered is that these associated cysts are the result of distension of a persistent Gartner's duct as it passes through both structures.—'Obs. Soc. Trans.,' 1894.

LEEDS & WEST RIDING
MEDICO-CHIRURGICAL SOCIETY

CHAPTER XXXVI.

OVARIAN CYSTOMA AND OTHER GROWTHS.

That surgeon has the least chance of committing an error in his diagnosis of an abdominal tumour who commences his examination of the case by recollecting the many possible and likely sources of error which he has to avoid. Gaillard Thomas has carefully collated a list of forty-three diseased conditions which may be mistaken for ovarian cystoma. It must also be remembered that it is not in the well-marked case of ovarian cystic disease that the careful surgeon is apt to fall into error. Rather is it when he is confronted by a case in which some obscure and unfamiliar signs are present, and when the history of the growth of the tumour is not clear, or that evident complications exist, such, for example, as pregnancy, great obesity, ascites, cystic degeneration of any of the abdominal viscera. But, independently of the nature of the tumour, there are other points which he has to decide, and which are of vital moment to the woman. Such are, its benign or malignant character, the presence of adhesions, the amount of solid matter present and its position, the general constitutional state of the patient, and the evidence of any grave affection of the lungs, heart, kidney, liver, spleen, bowel, or uterus, which may complicate the operation of ovariotomy, and contra-indicate its performance. Overweening self-confidence and ignorant assurance will nowhere more startlingly meet the rebuff they merit than in the case of over-confident diagnosis of abdominal tumours.

It may be well to enumerate those conditions which we are liable to confound with ovarian cystic disease :

Great obesity.
Hysterical tympanites and phantom tumour (pseudocyesis).
Fæcal tumour.
Dilatation of the stomach.
Distended bladder.
Hydrometra.
Hæmatometra.
Pyometra.
Physometra.
Hydro-salpinx.
Ascites.
Encysted dropsy.
Hæmatocele.
Cystic disease of the parovarium.
,, ,, kidney.
,, ,, spleen.
,, ,, liver.
,, ,, uterus.
Uterine fibromyoma.
Enlargements and displacements of the liver, spleen, and kidney.
Hydronephrosis and pyonephrosis.
Disease of the abdominal glands.
Omental tumour.
Pregnancy.
Extra-uterine fœtation.
Hydramnios.
Death of fœtus.
Pelvic abscess.
Hydatid mole.
Accumulation of pus or serum in the peritoneal cavity.
Malignant disease of the uterus.
,, ,, ,, peritoneum.

Extra-peritoneal cysts (Tait).
Mesenteric lipoma, or chyle cyst.

Nearly all these conditions I have myself known mistaken for ovarian tumour.

Examination of a Suspected Case of Ovarian Cystoma.

The directions given (pp. 37-110) as to the steps which must be followed in completing a diagnosis, and the ap-

Fig. 428.—Ovarian Tumour compressing Thorax (Sir Spencer Wells).

pliances necessary to conduct such examination, should be referred to. I shall here classify the positive and negative signs on which we rely in arriving at a diagnosis. Before doing so, it may be well to refer to the most important

facts in the history of an ovarian growth, which assist in diagnosis.

History and Early Symptoms. — The tumour has usually commenced at one side, and has at first caused but little distress. This, however, is by no means an absolute rule. There may be dysmenorrhœa, pelvic and reflex pains, and while the tumour is still pelvic, irritability of the bladder and rectum, or hæmorrhoids may form from pressure; all these early symptoms are aggravated if the cyst-wall forms adhesions, and if the tumour be prevented from rising into the abdominal

FIG. 429.—Ovarian Cystoma (Bright).

cavity. The general health is at first but little interfered with. There is no œdema of the upper or lower extremities. There is not much to rely on in regard to the menstrual periods, and menstruation may not be interrupted. Occasionally there is even menorrhagia; or, on the other hand, the flow may become in the first instance scanty, and finally cease. The breasts may slightly enlarge, and the characteristic appearances of early pregnancy (with the exception of the secretion of milk) may be present. Prolonged lactation has to be remembered. I have had a patient under my care who miscarried six years before I saw her. The breasts still secreted milk, and the flow

was increased at the menstrual advent. Obscure peritoneal pains are sometimes complained of—the result of distension or stretching of the peritoneum, or twisting of the pedicle. Nausea and vomiting occasionally accompany such pains.

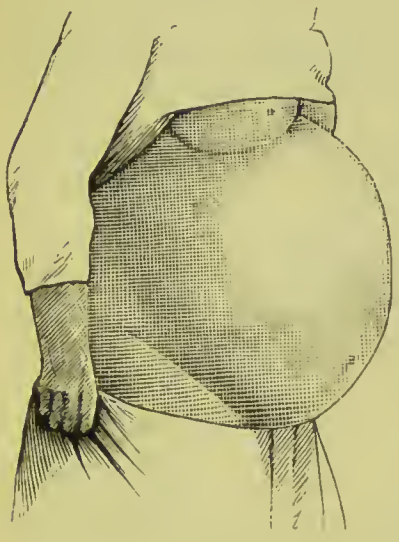


FIG. 430.—Large Polycystic Ovarian Tumour, in an excessively fat patient. The great distension of the upper abdominal zone is evident and characteristic of the obese.

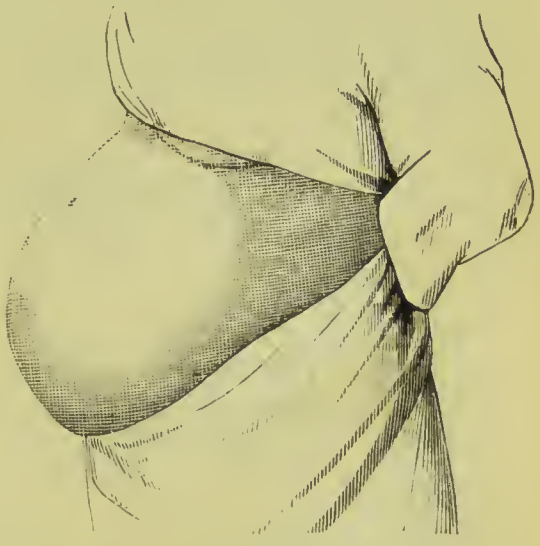


FIG. 431.—A Paunched Abdomen containing neither fluid nor tumour, but closely resembling an ovarian cyst.

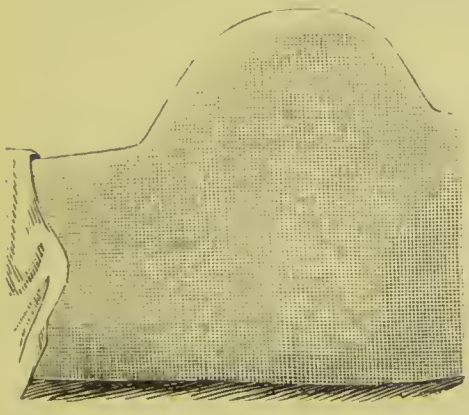


FIG. 432.—Vertical Outlines of a Myomatous Uterus.

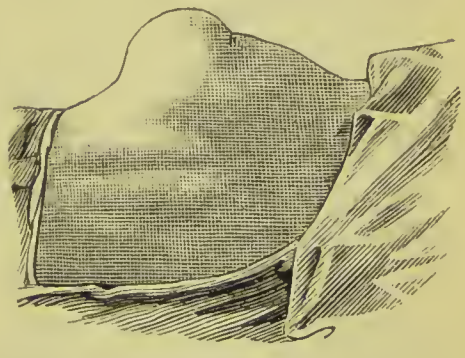


FIG. 433.—Nodular Outlines of a Large Fibrocystic Tumour.

OUTLINE DRAWINGS OF ABDOMINAL ENLARGEMENTS FROM PHOTOGRAPHS BY HOWARD KELLY.

The growth may still be distinctly asymmetrical after the tumour rises above the pelvis, but gradually it assumes a central position. There is not any regularity in the rate of growth. Some tumours may increase very slowly, or remain quiescent for a time; others develop with extraordinary rapidity, each week producing a marked change in the shape and size of the abdomen. The growth may now be attended with abdominal tenderness in parts, or peritoneal pain, while the pelvic symptoms are relieved. The countenance gradually begins to change. Confinement, anxiety, suffering, emaciation, tell in the expression of the face. Wells graphically describes the 'facies ovariana' of a patient: 'The emaciation, the prominent, almost uncovered bones, the expression of anxiety and suffering, the furrowed forehead, the sunken eyes, the open, sharply-defined nostrils, the long, compressed lips, the depressed angles of the mouth, and the deep wrinkles curving round these angles, form a face which is strikingly characteristic.' Should relief not come by operative means, the abdominal distension increases, the superficial veins may become enlarged, lineæ albicantes appear, constitutional symptoms, both thoracic and abdominal, are aggravated by the increasing pressure, and the patient finally sinks from the combined effects of emaciation and organic disease induced in the heart, lungs, stomach, or kidneys.

Hydramnios.

It is important to remember the chance of the surgeon mistaking hydramnios for ovarian cystoma. The difficulty in diagnosis consists in the absence of some of the signs of pregnancy in the case of hydramnios.

The following is a case in point:

Several years since I went prepared to tap a case in which most urgent symptoms of dyspnœa and lung complication threatened life, by what I decided, after most careful examination, was an enormous collection of ascitic fluid. There was albumen in the urine, and great œdema of the lower extremities. Before finally puncturing the abdominal wall, I passed the uterine sound, and discovered the enlarged uterus. The patient was delivered within twenty-four hours of a healthy child.

Ovarian Cysto-Sarcoma and Ascites.

In the case of a multilocular cysto-sarcomatous ovarian tumour, removed by me from a girl aged twenty, the diagnosis was obscured by the presence of a large quantity of ascitic fluid, which distended the abdomen. It was found on removal of this tumour that a few of the superficial cysts had ruptured, and this explained the ascites, which could not be accounted for before operation, all the viscera being healthy. She had been twice tapped. On drawing off some of the fluid prior to operation for the purpose of diagnosis, it was discovered to contain some slight traces of paralbumen, and yet it did not spontaneously

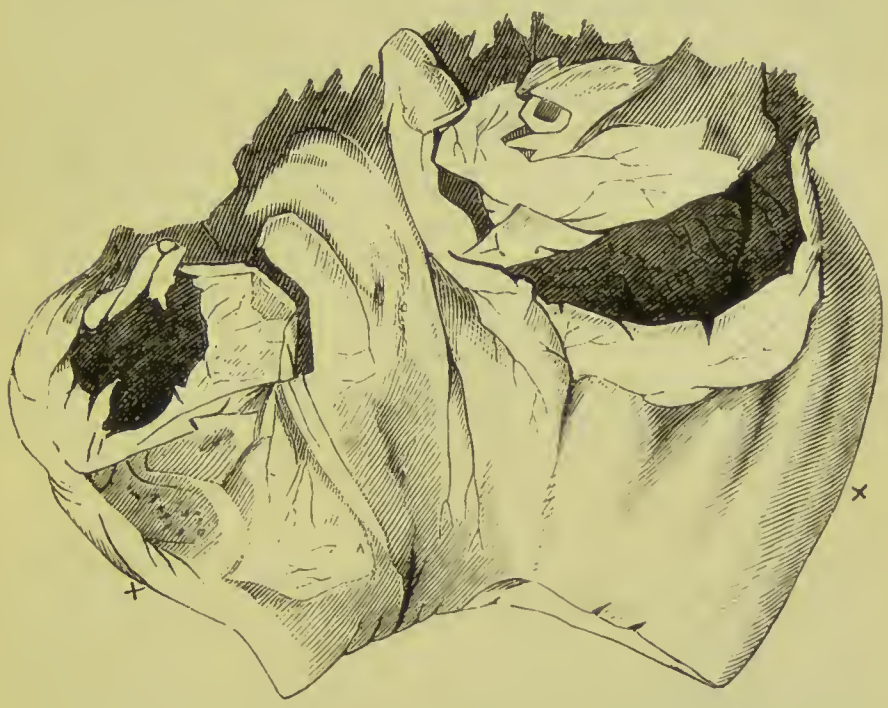


FIG. 434.—Solid multilocular Ovarian Cystoma, about a quarter the natural size. One side of the cyst as inverted, X—X, marks the solid portion of the growth. (Macnaughton-Jones.)

coagulate, as ascitic fluid would. A few of Drysdale's granular cells were found in different portions of the fluid examined. The operation proved the fluid to be in greater part ascitic, the few cysts which had burst on the surface of the cystoma not being larger in size than a hen's egg.

The liability to err in the presence of a quantity of ascitic fluid was well illustrated by a case recorded by Walter. There had been a suspicion of pregnancy in consequence of coitus and suppression of catamenia. But there were no signs of pregnancy, and hard, irregular masses were felt in the umbilical region. The presence of these masses, together with rapid enlargement of the abdomen, and no symptoms of tubercular disease, pointed to some malignant condition difficult to determine. A multilocular cystoma was discovered, which had ruptured and caused the ascitic accumulation.

Large Semi-solid Cystoma.

To illustrate the difficulty of diagnosis in a case of large semi-solid tumour of the ovary, I may cite the following case:

In 1890 I was consulted by a widow lady for a large tumour which had been diagnosed as a fibroid of the uterus. The mass had a very solid feeling on palpation, and fluctuation was with difficulty detected. The tumour, on careful examination, was believed to be distinct from the uterus, the cavity of which did not exceed three inches in length. It appeared, however, to fill the right hypochondrium, the epigastrium, and the left hypochondrium. In these regions, and above the level of the umbilicus, it was distinctly solid. It was most difficult to isolate it from the liver and spleen. Heywood Smith examined the case with me. We arrived at the conclusion that the tumour was a multilocular ovarian, and that it was in great part solid. How far it was adherent, or to what extent the adjacent viscera were involved, it was not possible to say. Operation proved that the diagnosis was correct. The parietal peritoneal adhesions were easily detached, but great difficulty was experienced in removing the tumour. It was impossible to get it through a rather extensive incision. I emptied all the cysts I could with the trocar. About nine pints of liquid were drawn off without apparently diminishing much the bulk of the tumour. I now enlarged the incision in the cyst-wall, and, grasping the inside of the cyst with my hand, withdrew it (by inverting it) through the abdominal incision. Fig. 434 represents the tumour; the stitched margin shows the opening which admitted the hand, and a curved line drawn from X—X marks the solid portion of the tumour. The patient made a rapid and perfect recovery.

Urachus Cysts.

Lawson Tait describes cases of extra-peritoneal cysts, closely resembling ovarian cysts, detailing the particulars of twelve cases in which these tumours occurred. Those cysts appeared in two instances to be developed from the urachus, in another from the Fallopian tube. They were not intra-peritoneal. In fact, in some instances, there appeared to be an absence of the pelvic peritoneum. The cyst-walls were related to the parietes in front, and the peritoneum posteriorly. The cysts were opened and emptied of their contents, and a drainage-tube inserted; in some instances the cysts were removed, or portions of the cyst-wall.

Impacted Ovarian Cysts.

Tenison Collins exhibited an ovarian cyst at the Gynæcological Society, removed under the following conditions. The patient was suffering from periodical metrorrhagia. 'She was very stout and anæmic. A tumour was felt indistinctly above the pubes, fixed and immovable, and dull on percussion. The flanks were resonant. *Per vaginam*, the anterior lip of the cervix was hard, and the os patulous; bimanually in front of the uterus was a hard, rounded, globular mass, apparently immovable, with no fluctuation. The sound passed three and a half inches, and caused hæmorrhage; somewhat limited mobility of the uterus was transmitted to the tumour; Douglas' pouch

was occupied by a movable enlarged ovary. The sound in the bladder passed to the left of the mass, which was felt separate from, above, and to the right of, the bladder.

'The long duration of the case, the severe menorrhagia, the apparently solid character and immobility of the tumour, the increased length of the uterus, and the compression symptoms, led me to confirm the diagnosis of myoma. Removal of the appendages or, if demanded after exploration, hysterectomy was advised. On operation the tumour proved to be a small, tense, impacted ovarian cyst.'

Physical Signs, Positive and Negative, of an Ovarian Tumour.

Positive Signs.

A tumour at first noticed in either inguinal region, gradually becoming central; the greatest circumferential measurement being below the umbilicus; lateral measurement in the early stages increased from the middle line to the vertebral column, or from the anterior superior spine to the umbilicus of the side affected.

Outline of the retained tumour can be defined.

Abdominal integument tense, frequently thinned—otherwise not abnormal.

Later stages: distension of abdominal veins, and lineæ albicantes seen.

Fluctuation limited to the dull area. Wave more distinct, but not so superficial as the ascitic wave.

Dulness on percussion, central: not much affected by change of posture; resonance in the flanks from the intestinal displacement. It must be remembered that the presence of gas in the cyst cavity may lead the practitioner astray by the resonant note it gives to percussion.

Uterus frequently displaced behind the cyst; on vaginal examination the uterus is frequently found drawn up from the examining finger; the cervix may be shortened.

Aortic pulsations (Atlee) are transmitted through the tumour.

The 'facies ovariana' is present.

The fluid drawn by aspiration or paracentesis is usually of an amber colour, but varies in colour and consistence; is

viscid and sticky, of specific gravity of 1015 to 1030; contains paralbumen and metalbumen; when examined under the microscope various forms of epithelial cells are seen, mixed with cholesterine particles, and perhaps oil-globules or blood-cells. The characteristic cell described by Drysdale as pathognomonic is a non-nucleated granular cell, on which ether has no effect, and acetic acid only renders the granules more distinct. Exploratory incision (as in

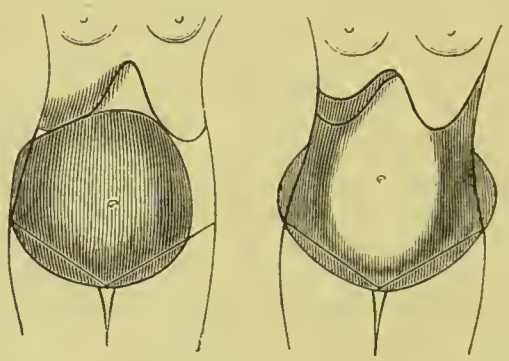


FIG. 435.—Dull Areas in Ovarian Tumour and Ascites (Barnes).

the first step of ovariotomy) detects the bluish-white, or glistening and smooth wall of the cyst.

Negative Signs.

The general health does not rapidly deteriorate.

The catamenia are not generally absent, though they may be scanty.

There is seldom menorrhagia.

There is no cardiac, renal, or hepatic disease to explain the dropsy.

Œdema of the extremities is not present (until very late in the disease).

The tumour is not central from the first; it does not proportionately increase from month to month, as in the case of the pregnant uterus; it is not hard and resisting.

The umbilicus is not prominent, bulged out, watery-looking, or thinned.

The integument is not materially altered in appearance or

œdematous; the distension of the superficial veins, as a rule, comes on late in the disease.

The cachexia of malignant disease, and of organic disease in the viscera, or of malignant ascites, is absent.

The most important signs of pregnancy are absent, such as:

Milk in the breasts (not necessarily absent, as an ovarian tumour may develop during prolonged lactation);

The fœtal pulsation;

Uterine contractions;

Ballottement (not necessarily absent; a solid tumour may be contained in an enlarged cyst, and give the sense of ballottement on practising this test).

The os uteri is not soft and patulous.

The uterine cavity is not (generally) enlarged.

The uterus does not move with the tumour, nor is the uterus found to be continuous with it (recto-vaginal and utero-abdominal methods).

There is no history of rigors, hectic, great pain, and nightly exacerbation of temperature.

The tumour does not lessen or disappear on the administration of chloroform, nor can any considerable depression be made in it under the influence of the anæsthetic.

It does not diminish perceptibly when the bladder is emptied.

There is no inordinate obesity in other parts of the body.

The fluid is not of very low specific gravity; it is not pure serum; it does not spontaneously coagulate; it does not, when kept, deposit filamentous particles of fibrine. The characteristic fibre cell of Atlee is present.

Paracentesis does not cure the disease.

Exploratory incision does not expose a dark-coloured and vascular tumour.

Diagnosis of Adhesions.

After his great experience in ovariotomy, Sir Spencer Wells remarks: 'Practically, therefore, in deciding whether ovariotomy should be recommended or not, adhesions to the abdominal wall may be almost disregarded.' Though this may be so in the hands of a skilled operator, it is widely different with those about to operate for the first time. The presence of adhesions to the pelvic viscera and intestines must influence the chances of a successful operation in the case of a young operator.

'Adhesions low down in the pelvis,' says the same author, 'are, on the contrary, of great importance. The difficulty is to separate them without serious injury to the rectum, or bladder, or the uterus, or to large blood-vessels, or to nerves. . . . When deep-seated and very intimate, the dissection necessary is out of the question in the living patient, and gives no small trouble in the dead.' To detect adhesions to the abdominal wall the patient is placed on her back, with the knees raised, opposite a good light, and the abdomen must be entirely uncovered. The proofs that Sir Spencer Wells relies on that the cyst is free of adhesions to the abdominal parietes are as follows: (*a*) Movement of the cyst-wall visible with the acts of respiration (percussion enables us to limit the superior border of the cyst, and prevents our mistaking it for the transverse colon). (*b*) By percussion the dull sound will descend in inspiration, rising again in expiration. (*c*) With the hands placed flatly on the abdominal wall, no crepitus can be felt, which may be present if any adhesive cords of lymph stretch from the cyst to the abdominal wall: audible crepitus is heard when the lymph-surfaces are recent (the fact that omentum may intervene between the cyst and the abdominal wall is not to be forgotten);* its proximity to intestine, and the consequent resonance on percussion, and the softer and doughy feel, help to distinguish it. (*d*) 'The recumbent patient is directed to try and sit up without assisting herself by her hands or elbows. This effort puts the recti on the stretch, and if a tense ovarian cyst is free from adhesion, it falls backwards and to the sides, while the muscles form a projecting ridge in the centre of the abdomen.' Only when the adherent cyst—it may also occur in the case of a small cyst—is 'flaccid or partially empty' is this appearance seen. (*e*) The umbilicus moves with an adherent cyst. (*f*) By placing the woman in the knee-elbow position, and examining the tumour through the vagina, if there are pelvic adhesions it does not yield to digital pressure, and the uterus may be pushed out of position or fixed. A portion of an ovarian cyst may occupy the pelvis and become fixed there, and still no adhesions exist. (*g*) If there have been recurrent attacks of peritonitis,

* Bantock says that 'crepitus is felt, or heard, when the omentum lies between the cyst and parietes, BUT FREE AND NOT ADHERENT. When adhesion exists between the cyst and parietes there is no crepitus. I have demonstrated this over and over again.'

with severe pain and uterine cramp, we may suspect that there are adhesions, or some twisting of the pedicle.

Inflammation and suppuration of the interior of the tumour may be suspected if there are rigors, rapid pulse, diarrhœa, hectic and elevation of temperature. Such inflammatory action may lead to rupture of the cyst and discharge of its contents into the abdominal cavity, or, as the consequence of adhesions, the cyst may empty itself through a fistulous opening by the abdominal wall, or discharge itself by the vagina, bladder, uterus, or rectum. Death may occur ultimately from pyæmia or exhaustion.

Internal hæmorrhage into the interior of the cyst will be suspected if symptoms of intense shock set in suddenly with collapse.

I have thus very briefly summarized the most important and reliable signs and symptoms by means of which we are enabled to say: 1st, that the growth is ovarian; 2nd, that it is unilocular or multilocular; 3rd, that it is not malignant; 4th, that it is not a cyst of the parovarium; 5th, that there are or are not adhesions; 6th, that inflammatory changes have not occurred; 7th, that internal hæmorrhage is not going on into the cyst.

It is seldom that the careful diagnostician, proceeding step by step in the examination of a case, will fall into error. Keeping clearly in his mind the possible pitfalls always open for hasty conclusions, he must check one test by the application of another, and deliberately balance probabilities. Should he be in doubt between any two decisions, he will carefully apply all the facts of the case to each separately, comparing critically the weight of evidence which inclines him one way or other. The practitioner has to remember that such conditions as pregnancy, encysted dropsy, ascites, fibro-cystic disease of the uterus, extra-uterine fœtation, hydramnios, have deceived the most experienced living authorities. Therefore he will hurriedly express no opinion either to patient or friends; nor, indeed, will he commit himself, in case of doubt, to any final opinion,

Differentiation of Unilocular, Multilocular, Parovarian, and Malignant Cysts.

UNILOCULAR CYST.	MULTILOCULAR CYST.	PAROVARIAN CYST.	MALIGNANT CYST.
Surface smooth.	Surface irregular and lobular.	Occurs in very young persons.	Occurs more frequently after forty.
Fluctuation free in all directions.	Fluctuation circumscribed and interrupted.	Is comparatively rare.	Nodular and irregular.
Growth not so rapid.	Growth rapid.	Fluctuation very superficial, and walls of cyst very thin.	Grows rapidly.
Contains the usual ovarian fluid.	Contains often blood corpuscles, and the fluid is denser, and perhaps discoloured.		Solid contents, or is solid.
Circumferential measurement below umbilicus 35—45 inches (Peaslee).	Circumferential measurement below umbilicus 55—78 inches (Peaslee).		
Adhesions not common.	Adhesions common.		Glands involved.
General health not so rapidly involved.	Rapidly fails.	Does not affect the general health much.	Emaciation and cachexia come on quickly.
			Pain is present, especially at night.
If tapped the tumour is emptied, and quickly refills.	On tapping we do not empty the tumour.	Does not usually refill after tapping.	Ascitic fluid surrounds the tumour, and on examination the 'proliferating cell' of Foulis is detected in the fluid examined.

without a full examination and consultation, in an obscure case of 'abdominal' or 'pelvic' tumour, until such time as its nature is clearly defined. Should any uncertainty remain, it is better to leave the question an open one. This is the more necessary, as in many instances he may not have the means nor opportunity of applying such crucial tests as aspiration, paracentesis, the microscope, and chemical analysis. And one caution more I may add here. Even when the fact of the existence of an ovarian cyst is decided, we have to recollect that complications may exist, such as pregnancy, ascites, inflammatory conditions of the pelvic or general peritoneum malignant disease, uterine tumour, cysts of the abdominal viscera, etc. There may be two ovarian tumours; one may escape detection. (Should the two ovaries be involved, there may be a double tumour and a well-marked sulcus between.) Before we finally express any decided opinion, it is well to exclude the possibility of any complication, as, through it, the case afterwards may assume much more serious proportions, and there may be the reflection on the part of the patient that it had escaped detection.

Treatment.—This practically resolves itself into—

General.
Palliative.
Removal of the cyst.

It would be sheer waste of time to discuss the general treatment of ovarian tumours by drugs. We may maintain the general health and support the patient's strength by suitable tonics and the administration of proper nourishment, while we see that sufficient time is spent in the open air, and the mind is as far as possible prevented from dwelling on the malady and the chances of recovery. The bowels generally require attention, and the bladder may have to be relieved in consequence of pressure; any secondary changes in the cyst, or such an accident as hæmorrhage, must be dealt with as they occur. The one treatment for ovarian tumour, with rare exceptions, is ovariotomy. I have already referred to the opera-

tion of paracentesis abdominis and the methods of performing it, and vaginal paracentesis.

On the disputed question of tapping, Sir Spencer Wells, from the results of 265 cases in which tapping was practised, draws the conclusion: 'the mortality of ovariotomy is but little affected by tapping;' 'in some of the patients who have been tapped most frequently, there were no adhesions, while there were firm adhesions in some who had never been tapped.' *There is no doubt, however, that the general feeling of gynæcologists is strongly against tapping.* '*The golden rule*,' *says one writer* (*Goodell*), '*is not to tap.*' Sir Spencer Wells distinctly places before us these propositions:

'1. That in cases of simple ovarian, or extra-ovarian, cysts, it is right to try the effect of one tapping before advising a patient to undergo a more serious risk. But in compound or multilocular cysts the third proposition holds good.

'2. That one or many tappings do not increase considerably the mortality of ovariotomy.

'3. That tapping may sometimes be a useful prelude to ovariotomy, either as a means of gaining time for a patient's general health to recover, clearing the urine of its load of albumen, with which it is sometimes charged under the mere influence of pressure, or of lessening shock by relieving her of the fluid a few hours or days before removing the solid portion of an ovarian cyst; and

'4. That when the syphon trocar (Spencer Wells') is carefully used, in such a manner as to prevent the escape of ovarian fluid into the peritoneal cavity, and the entrance of air or of putrefactive material into the cyst, the danger of tapping is extremely small. On the subject of tapping ovarian cysts, Bantock writes: *Consent is now almost universal that ovarian cysts should not be tapped, except under the circumstances included under head* "3."'

Tapping through the rectum is a step we need not consider; and all other means, such as injection of iodine, and the formation of a permanent opening in the cyst, have been generally abandoned. Sir Spencer Wells recommends the injection of the iodine when, after tapping by the abdominal wall or elsewhere, inflammation has occurred, and the patient is suffering from the decomposing contents of the cyst. It is well to deodorize the fluid which escapes. This lessens the risk of pyæmia and septicæmia. A solution of one part of iodine and two of sulphurous acid to twenty of water, or of one part of sulphurous acid to eight of tepid water, is used. This is injected night and morning.

With regard to the operation of ovariotomy, I shall only here remark that the surgeon who is not familiar with the accidents and complications to be met with in the removal of

large abdominal tumours, and whose manipulative skill is not seconded by the experience gained, both in seeing ovariotomy performed and assisting at the operation, assumes a grave responsibility in operating for the first time without this experience. There can be no doubt that in this, as in the case of other operations, were the entire number of deaths resulting from ovariotomy published annually, the death-rate would be considerably increased, and the mortality from this operation would appear much larger than that which is quoted as following the practice of the most skilful of operators.

Coolness, nerve, readiness of resource, decision, and frequently manipulative skill, are required in the careful removal of *complicated* ovarian cysts. The operator who feels that he has *in himself* these qualities may have no hesitation in operating. *He who does not, has no justification in attempting an operation frequently requiring all of them.*

Sir Spencer Wells' observations on the expediency of operating are worthy the attention of all surgeons:

'With the experience of the nine years which have elapsed since the publication of my edition of 1872, I have become more and more disposed to advise the removal of an ovarian tumour as soon as its nature and connections can be clearly ascertained, and it is beginning in any way, physically or mentally, to do harm, since the risk of the operation under such circumstances is certainly less, and the possible evils of delay are eluded. Where, however, while the development continues, the symptoms follow their usual course, and the distress of the patient forces her to demand some kind of relief, there is either reluctance or refusal to face the liabilities of excision, or family considerations impose the necessity of delay, the size, nature, and connections of the tumour must guide us in the selection of one or other of the minor methods of palliative surgical treatment, which, though they seldom lead to a cure, have the advantage of enabling us to alleviate the most distressing symptoms, and to wait for an opportunity to try some of the greater expedients which have been from time to time adopted for the obliteration of these cysts, or to carry out the last resource of ovariotomy.'

In the 1885 edition of his work on abdominal tumours Sir Spencer Wells says:

'The probable result of ovariotomy can be estimated with far greater accuracy by a knowledge of the general condition of the patient than by the size and condition of the tumour. In other words, a large tumour, extensively adherent, in a patient whose heart and lungs and digestive and eliminative organs are

healthy, and whose mind is well regulated, may be removed with a far greater probability of success than a small unattached cyst from a patient who is anæmic or leukæmic, whose heart is feeble, whose assimilation and elimination are imperfect, or whose mind is too readily acted upon by either exciting or depressing causes. I believe this to be the explanation of the facts which have led some superficial observers to assert that the more advanced the disease the greater, and the earlier the stage of the disease the less, is the probability of recovery. I am convinced that this reasoning is based on the observation of a few exceptional cases where small unattached tumours have been removed with a fatal result from unhealthy or infected persons, or where large attached tumours have been successfully removed from persons who have otherwise been constitutionally sound. Small unattached tumours in strong healthy persons have by no means given the best results. It is possible to operate too early as well as too late—to place a patient's life in peril by operation before it is endangered by disease—just as it is possible, on the other hand, to delay operation until the powers of life are so exhausted that recovery after a severe operation is impossible.'

Fibroma, Myoma, and Sarcoma of the Ovary.

'True fibrous tissue,' Doran observes, 'is naturally abundant in the tissue of the hilum (paroöphoron); this fact is

Fig. 436.—Fibroma of the Ovary. The bands of pure fibrous tissue bear small fusiform nuclei, and include small cells with oval nuclei. (Doran.)

enough to account for fibroma of the ovary' (Fig. 436). 'Ovarian fibromata,' says Bland Sutton, 'are very rare. Many specimens described as such have turned out on careful

re-examination to be typical spindle-celled sarcomata. It is very difficult to obtain reliable and complete records of a sufficient number of cases to enable a satisfactory description of the clinical aspects of ovarian fibromata to be written.'

I record the particulars of the following instructive case, as it not alone exemplifies the difficulties of diagnosis, but also is a typical example of pure fibroma of the ovary. In fact, there are few so typical on record.

Fibroma of the Ovary.

Miss H——, aged 22, consulted me for persistent sickness associated with periodical epigastric pain and considerable anæmia. For eighteen months previous to seeing me the catamenia had been absent. These were the only symptoms present. I made a careful examination of the lungs, heart, and abdominal viscera, with a negative result. I suggested a Weir-Mitchell course, and a careful examination of the urine and blood, as I was apprehensive that the anæmia might be of a pernicious character. Her medical attendant acquiesced in this view, and accordingly she entered a medical home for treatment. The morning subsequent to her admission I determined to make another abdominal examination, and was surprised to find a movable tumour about the size of a small orange in the left inguinal region. The patient herself was unaware of its existence, nor had she suffered any pain other than the epigastric. I immediately notified to her parents and medical adviser the discovery of the tumour, and my determination to examine her under an anæsthetic the following morning. Going casually to the home to arrange for the examination which was to be made early the next day, I thought that I would again palpate the left side, when to my astonishment I found that the tumour had disappeared, and was nowhere to be found. Surmising that it might possibly have been a fæcal accumulation in the sigmoid flexure, and finding some fæcal masses in the rectum, I ordered an enema, thinking that I might possibly have dispersed a mass by manipulation. The following morning, under ether, I made a vaginal examination, and discovered a tumour lying between the uterus and bladder in the middle line, hard and movable. The choice lay between a dermoid cyst or fibroma of the ovary. I determined its freedom from both bladder and uterus, though it was evident that by the distended bladder on the previous morning it had been raised from its pelvic position, to which it sunk when the bladder was empty. Two days afterwards I removed the tumour in the presence of Bland Sutton, who examined it carefully, and was satisfied of its purely fibrous nature. It was encapsuled, and when cut across presented a pearly white and glistening appearance, showing to the naked eye wavy fibres. The following is the report received from the Clinical Research Association :

'The ovarian tumour shows microscopically nucleated spindle-celled tissue, which is arranged in very definite interlacing bundles. The coarseness of the tissue, the distinct formation of fibres, and their wavy arrangement, are good reasons for regarding the tumour as a fibroma rather than a sarcoma. Sections

have been made from different parts, and they all show the same appearances. The vessels in the tumour are numerous and well formed.'

FIG. 437.—Microscopical Section ($\frac{1}{8}$-in. obj.) of Fibromatous Tumour of the Ovary (Author).

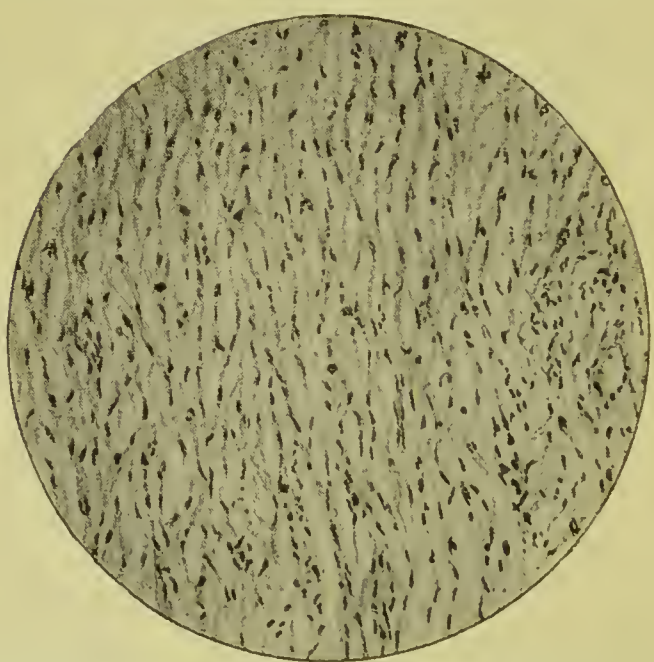


FIG. 438.—Microscopical Section (1-in. obj.) of Fibromatous Tumour of the Ovary (Author).

'The naked-eye appearance of the small fragments of the ovarian tumour which have been preserved is somewhat like that of uterine fibroid. The cut surface shows white fibrous strands which interlace, but are not arranged in whorls. Here and there small gray areas may be seen distributed among the white strands. There is a distinct capsule composed of thick white peritoneum and a subjacent layer of cellular tissue traversed by numerous vessels, some of which are of considerable size. Septa pass from this capsule into the tumour for a short distance, indicating that the tumour has a tabulated outline. The serous surface of the fragments is quite free from adhesions. The tumour as a whole feels firm and elastic, but less dense than the common fibroid.'

The other ovary was not typically healthy, as there was some cystic proliferation, and it was very slightly enlarged. However, there was nothing to demand its removal.

Note, in connection with this case, the youth of the patient, the absence of menstruation, the painlessness of the tumour, its extreme hardness to the touch, its freedom and mobility, and associated movement with the bladder.

Muscular tissue (Doran) is found amidst the parenchyma of the ovary in the coats of its vessels, and also in free bundles

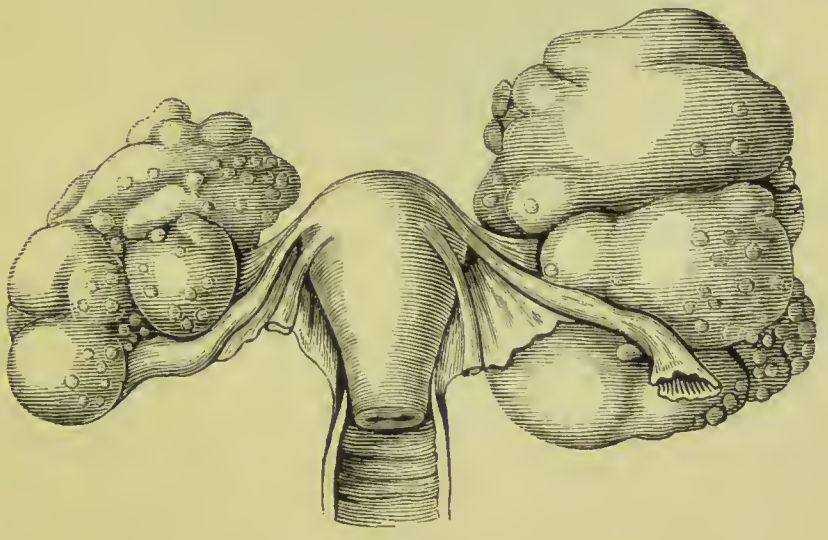


FIG. 439.—Fibroma of both Ovaries (Cullingworth).

derived from the ovarian ligament, a process of the uterus. The connective tissue of the ovary around the follicles is variable in character, but as a rule of a "young" type. Sarcoma of the ovary (Fig. 440) is not rare, owing probably to the frequent abundance of this "young" connective tissue. As muscular tissue naturally exists in the ovary, the develop-

ment of myoma can be accounted for. Many cases of fibro-myoma of the ovary have been described. The ovarian ligament is entirely composed of fibrous tissue and plain muscular fibre; in two instances, at least, large myomata have been observed to spring from that ligament, which is really a process of the uterus running to the ovary.'

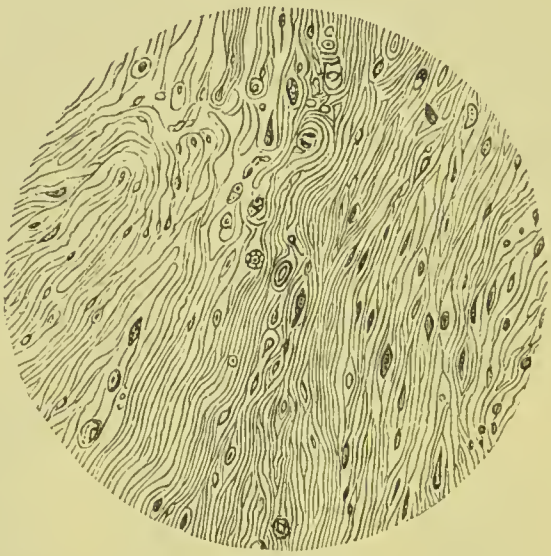


FIG. 440.—Sarcoma of the Ovary. From a portion where much fibrous tissue was blended with spindle cells. (Doran.)

Cullingworth exhibited before the Obstetrical Society of London an interesting specimen of fibroma of both ovaries, which he removed after death from a woman, aged thirty-six, who died of ascites (Fig. 439). She had been pregnant five years previously, and had noticed a swelling in the right groin about this time at the conclusion of the pregnancy. The tumours lay in front of and behind the uterus—the larger of the two behind. They were non-adherent. Some of the tumours partook in part of the cystic character ('Transactions Obstet. Soc.,' vol. xxi., 1879).

Endothelioma of the Ovary.

Mary Dixon Jones has written largely on the subject of endothelioma of the ovary. She has drawn attention to the transitional stages through which 'the anatomical elements of the ovary are more or less transformed into an embryonal medullary tissue. From this newly-formed tissue are developed the endothelia, long branching protoplasmic bodies, filled with

living matter in the shape of coarse granules and hematoblasts. These protoplasmic masses have a striking resemblance to net-celled sarcoma, and, like it, they have the power of changing into their own any and every tissue of the ovary. The endothelia are seen to be gradually transformed into blood-corpuscles and bloodvessels, and thus is formed between unchanged endothelia a collection of blood and bloodvessels. The growth under consideration is, then, a profuse new formation of red blood-corpuscles and bloodvessels, mainly of capillary or venous nature, and at last terminates in what we know to be hæmatoma of the ovary. The ovary thus, in the full development of the disease, becomes a blood-cyst, and is usually found adherent to the adjacent organs in consequence of repeated attacks of peritonitis. As the hæmatoma grows and increases in bulk, a gradual thinning of the sac or capsule of the ovary takes place, with the danger of rupture.'

The clinical features of the disease, according to her, are characteristic—pain in the region of the ovaries, severe, sharp, and lancinating; a pale, cachectic look, and marked emaciation, the more remarkable as many of the patients are *embonpoint* when the disease attacks them. There is occasionally accompanying salpingitis. Sections of the growth have the appearance of net-celled or alveolar sarcoma. It is characterized by a rapidly-growing formation and the presence of masses of granules; in short, it is a malignant neoplasm. The extreme severity of the symptoms demands early oöphorectomy.

Gyroma of the Ovary.

The author we have just quoted has also drawn attention to the association with endothelioma of a peculiar pathological state which she has termed 'gyroma'; that is, 'a convoluted mass, and in its full development a homogeneous, firm structure, frequently occupying the whole area of the section of the ovary, replacing almost all the normal anatomical elements. It usually results from morbid changes in the structureless

membrane of a ruptured Graäfian follicle, but may also arise from certain changes in the arteries, such as endarteritis obliterans or waxy degeneration of the same.' Though it may exist in cases where there is no trace of endothelioma, she has shown that gyroma is frequently the first stage of the former disease. The most characteristic difference in the clinical features in the two diseases is found in the ex-

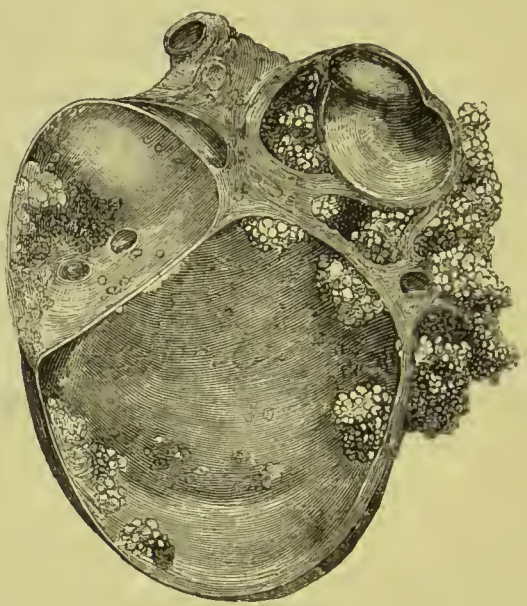


FIG. 441.—Papilloma of the Ovary (Cullen). Half of Tumour. Springing from its outer surface are papillary masses. Internally it is composed of one large and six smaller cysts. Projecting from the inner surface of these are papillary masses. The large cyst *c* contains a tenacious fluid which was coagulated by the Müller's fluid. *a* is a cross-section of the Fallopian tube. (Two-thirds natural size.)

aggerated nervous and mental symptoms present in gyroma, which may amount to hysterical insanity or hystero-epilepsy. These nervous symptoms she regards as the outcome of pressure, irritation, and destruction of nerve-fibres, producing local distress, as well as reflex neuroses. The gyromatous masses are at times hard, and the Graäfian follicles are surrounded by layers of fibrous hyaline and inflamed cartilaginous tissues, which imprison and compress the nerve-fibres. The ova of the cortex are diseased.

Papilloma of the Ovary.

T. S. Cullen, of John Hopkins Hospital, has reported a case of papilloma of both ovaries in a patient under the care of Howard Kelly. The patient was forty-one years of age, and married. The principal symptoms of which she complained were loss of weight, enlargement of the abdomen, weakness and emaciation, with a burning sensation in the right hypogastrium. The uterus was found on examination to be retroflexed, and apparently fixed. A mass of indefinite size was found per rectum in Douglas' pouch. The drawing shows the replacement of the ovary by a cystic tumour, with multiple cysts and papillary-like masses developed on their walls. The cyst contained tenacious or limpid fluid. Microscopical examination proved it to be, as suspected, a papilloma.

Angio-Sarcoma of the Ovary.

Cullen has also reported a case of Angio-sarcoma (endothelioma) of the ovary. The tumour, which was attached to the rectum and sigmoid flexure, involved the uterus and the sac of Douglas. It was a round and spindle-celled sarcoma. The cells were arranged round the bloodvessels. 'The vessels had an inner lining of endothelium, snrrounding which in some places is a delicate muscular coat, the outer portions of which appear to have undergone hyaline degeneration. Immediately surrounding the muscular coat are eight to ten layers of spindle-shaped cells running parallel to the vessel.'

'These tumours have two chief sources of origin: first, those arising from the bloodvessels (Amann — four cases, Ackermann, Eckardt, Marchand); second, those springing from the lymphatics (Amann, Flaischlen, Leopold, Marchand, Pomorski, v. Rosthorn, v. Velits and Voigt). These two divisions are again subdivided according as the sarcoma arises from the outer sheath of the vessels or from their endothelial lining.

'*The case quoted was undoubtedly perithelial in origin*, growing from the outer coats of the bloodvessels. As it is sometimes very difficult, and in fact impossible to say whether it arises from the outer or inner sheath of the vessels,' Cullen thinks, 'the two divisions are sufficient, viz., those arising from the bloodvessels and those springing from the lymphatics.

'These tumours have occurred in children 7 years of age, and in women 64 years old. The average of eleven cases was 33 years.'

CHAPTER XXXVII.

OPERATION OF OVARIOTOMY FOR OVARIAN CYSTOMA.

In the chapter on the Operative Surgery of the Uterus and Annexa will be found full directions as to antiseptic precautions, the operator, assistants, and nurses, the instruments and appliances generally required, the room and dressings, and the preparation of the patient for cœliotomy. All these directions apply with equal force to the operation of ovariotomy (see pp. 416-424). And in the chapter following that, I have pointed out the different kinds of suture and ligature used in abdominal surgery, as well as the method of closing the abdominal wound (pp. 425-434). Before considering the operation now under discussion, these instructions and precautions should be carefully studied.

Additional Appliances required.—In addition to the instruments and appliances enumerated (pp. 420, 421), the following are required :

Ovariotomy cautery clamp.
Pedicle clamps.
Wells' ovariotomy trocar.
„ smaller trocar.
Long blunt pedicle needle.
Pedicle forceps for securing short pedicle.
Kœberlé's pressure forceps.
Cyst forceps for seizing cyst-wall.

Aspirating sucker of Tait.
Syphon trocar of Tait.
A few other cyst forceps.

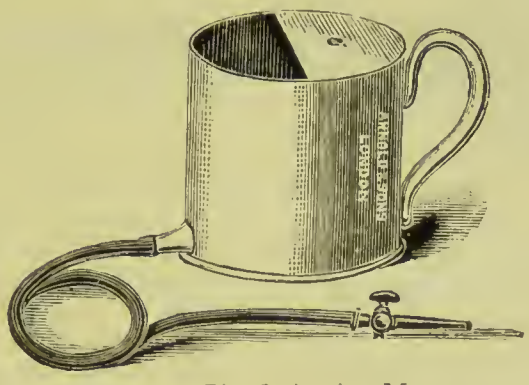


FIG. 442.—Pint Irrigation Mug.

The Operation.—The following are the steps of the operation :

1. The abdominal incision.
2. Arrest of hæmorrhage.
3. Opening of the peritoneum.
4. Exposure of the cyst and management of adhesions.
5. Use of the trocar and evacuation of the cyst contents.
6. Drawing out the cyst-wall and freeing it of other adhesions if they exist.
7. Arrest of bleeding.
8. Securing the pedicle.
9. Peritoneal toilette.
10. Closure of the wound.
11. Dressing of the wound.

The assistants and nurses having taken their places, the operator, standing at the right side of the patient, makes a clean cut from four to six inches in length through the linea alba, in the middle line, passing through

integument,
subcutaneous tissue and fat,
linea alba,
fascia transversalis and fat.

He keeps exactly in the middle line, avoiding the rectus sheath. If the operator should open the sheath of the rectus,

FIG. 443.—Wells' Torsion Forceps.

he may either complete the incision by cutting directly through the muscle, or he can pass a grooved director in towards the middle line to guide him to the linea alba. Wells' pressure forceps are now applied to the bleeding-points, and all hæmorrhage is arrested by forcipressure or ligature. The peritoneum is next caught with a dressing forceps, and it is opened with a scalpel laid horizontally beneath the forceps.

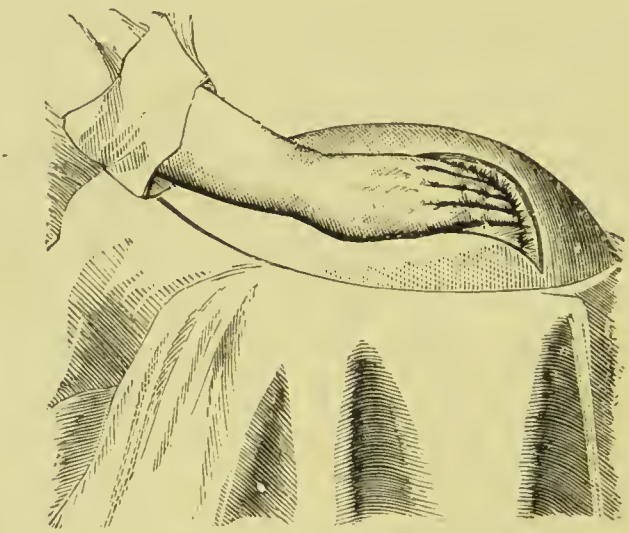


FIG. 444.—Examining Cyst-wall for Adhesions (Sir Spencer Wells).

If fluid be in the peritoneal cavity, the patient is turned a little on the side, and the fluid is allowed to run through an extemporized spout of the waterproof sheeting into a bucket at the side of the table. (See pp. 123, 124 for Smester's and Jessett's funnels.) The cyst being now exposed, a Wells' trocar is taken in the right hand of the operator, and with it the cyst

...EDS & NI... PUBLIC LIBRARY ...OCIETY

is pierced, and the fluid permitted to run through a tube into a side-bucket. The sliding cannula or shield, regulated by a

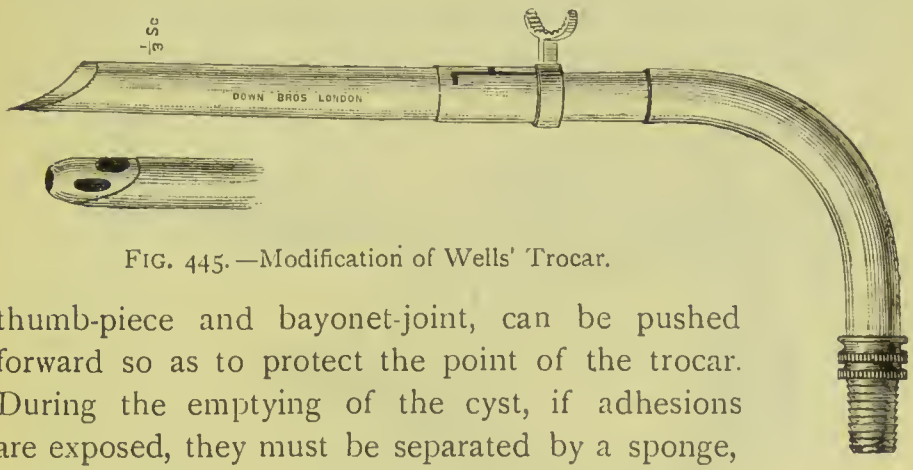


FIG. 445.—Modification of Wells' Trocar.

thumb-piece and bayonet-joint, can be pushed forward so as to protect the point of the trocar. During the emptying of the cyst, if adhesions are exposed, they must be separated by a sponge, which will be found most convenient for the purpose, and any bleeding vessels are seized and quickly tied with aseptic silk. Some may be seized with torsion forceps and

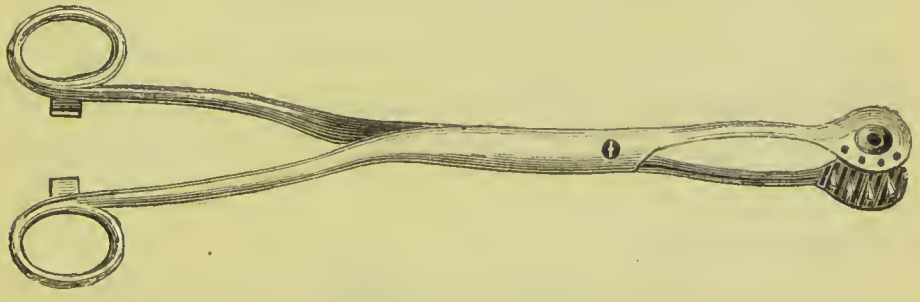


FIG. 446.—Nélaton's Forceps for seizing Wall of Cyst (see p. 475).

twisted. If the cyst be multilocular, the trocar can be used to empty two or more cysts without removal of the instrument, by plunging it into each separately through the septum separating the emptied from the full cyst. The cyst having been partially emptied, the spring teeth are made to grasp its wall firmly, and thus the tumour is carefully drawn through the abdominal opening, any remaining adhesions being freed as this is done. The assistant, standing opposite the operator, slips his right-hand middle finger inside the abdominal wound, including the entire structures divided, and he thus hooks the abdominal wall forwards, securing both sides of the wound

with the thumb and forefinger of the same hand. His left hand is thus free to keep pressure on either side if necessary. The large flat warm sponge is now carefully slipped in over the intestines to protect these and prevent prolapse. The im-

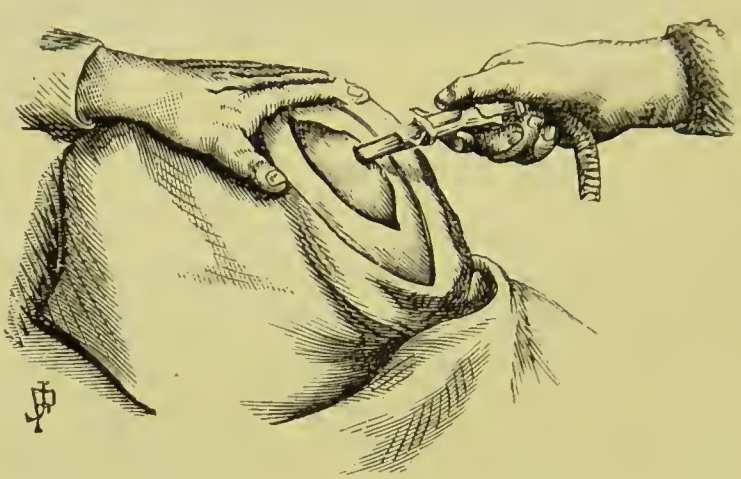


FIG. 447.—Insertion of Trocar into Cyst (Sir Spencer Wells).

portance of thus preventing prolapse of the viscera must not be lost sight of. Another assistant supports the tumour as it is drawn out, and prevents dragging or traction, receiving the

FIG. 448.—Drawing the Cyst out of Incision (Sir Spencer Wells).

emptied cyst in a basin. The pedicle is now transfixed with a long blunt-pointed needle carrying a double silk ovariotomy ligature. This is cut and made to interlace in a figure-of-eight fashion, each half of the pedicle being thus safely secured with

reef-knots.* With pressure forceps the pedicle is now held below the ligature, and the cyst is cut off at a sufficient distance from the ligature not to run any risk of interference with it, yet leaving sufficient of the pedicle to examine its

FIG. 449.—Forceps for securing Short Pedicle before Ligature.

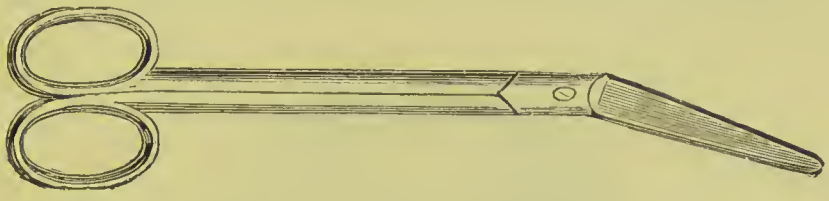


FIG. 450.—Bent or Flat Scissors.

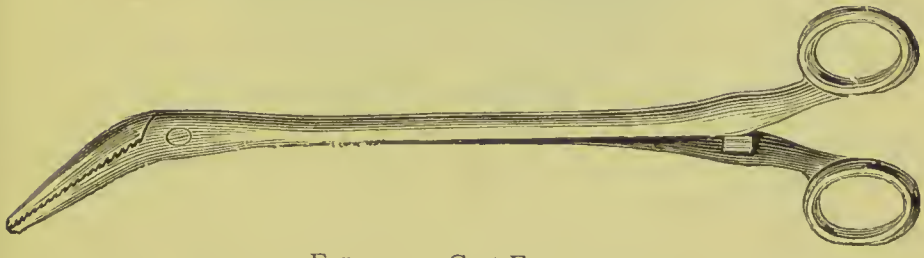


FIG. 451.—Cyst Forceps.

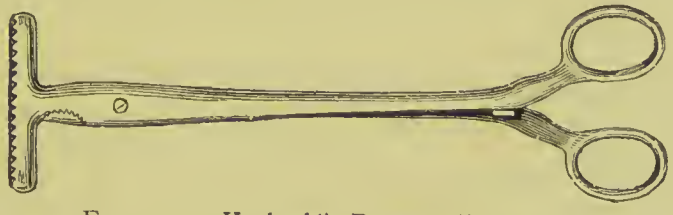


FIG. 452.—Kœberlé's Pressure Forceps.

surface carefully before it is dropped into the pelvic cavity. The tightness with which the pedicle is tied, and the exact nature of the ligature, must occasionally depend on the character of the pedicle and its vascularity. When the cyst is thus removed, the other ovary and tube should be carefully

* See chapter on Sutures and Ligatures.

examined, and, if diseased, should be taken away. To deal dexterously with adhesions, especially those found in the pelvis, is a matter of experience and manipulative skill. Some are easily separated by the fingers and sponge. Others require ligaturing and subsequent division. Some may demand division with Paquelin's knife. To see adhesions in the pelvic cavity a large reflecting mirror is useful.

There is an interesting observation by Ruine, in Langenbeck's *Archiv.*, 'that abscess pus and pure cultures of pyogenic bacteria may be injected into the uninjured peritoneal cavity without more than transient inflammation ; but that when a portion of peritoneum has been removed so as to leave the connective tissue exposed, there is fatal sepsis.' This accounts for the high mortality after adhesions in operations.

FIG. 453.—Grasping Solid Trabecular Tumour (Sir Spencer Wells).

THE PERITONEAL TOILET.—This is just the portion of the operation which an inexperienced operator is apt to get through hurriedly, and it is also the part requiring most patience and care. When the pedicle is dropped back, the peritoneum must be carefully dried with warm sponges, and all blood and serum sponged out. The abdominal cavity cannot be left too clear of any fluid or clots. On this depends, in a great measure, the success of the operation. If we have any doubt whether, owing to obstinate hæmorrhage, prolonged oozing, or the possible infection of the peritoneal cavity by the escape of septic material or fluid into it, drainage is indicated, it is

far better to put in a Keith's or Tait's drainage-tube before closing the wound.

FIG. 454.—Keith's Drainage-tube.

FIG. 455.—Tait's 'Test-tube' Drainage-tube.

Tait lays special stress on the advantage of washing of the peritoneum over sponging. He uses his syphon trocars (large or small) both for drawing off the contents of the cysts and for syphoning the abdomen. The indiarubber tubing is attached to the open end of the trocar, and water at a temperature of 106° to 107°, or even to 120° in case of hæmorrhage, is syphoned into the abdomen. He uses a special aspirating sucker (Mappin, Birmingham) to remove the remains of the fluid (Fig. 456).

In all cases of threatened hæmorrhage, ruptured cysts, accompanying ascites, and as a means of secondary cleansing, Tait says that by using this drainage-tube he avoids all risk of what he considers a 'not imaginary danger,' viz., the punching of a hole in the intestine by the ordinary drainage-tube.

'It is still,' writes Sir Spencer Wells, 'a question for future observation if flushing the peritoneal cavity with water be a really good practice, whether drainage be not often adopted unnecessarily, and whether the cleansing of the peritoneum by careful sponging be not the better practice.'

When all is perfectly clean and dry, the large sponge, wrung out of some perchloride of mercury solution (1 in 10,000), is left in position, and the abdominal wall is closed by separate suturing of the peritoneum, fascia, and the entire thickness of

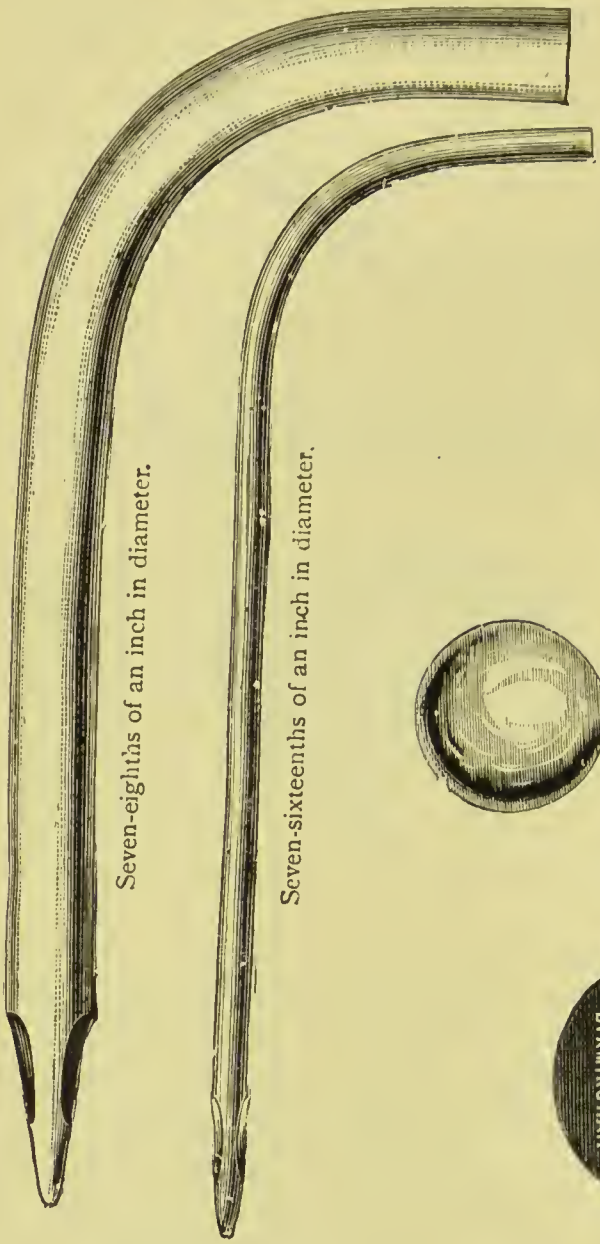


FIG. 456. FIG. 457.

Tait's Aspirating Sucker and Ovariotomy Syphon Trocars. A glass nozzle is preferable for reasons of cleanliness.

the abdominal wall, including the muscle and skin. The needles are ready, the straight in pairs threaded with silk, to be passed from within out, and the sutures are not drawn too tight, to avoid strangulation of the skin. (See p. 425, also p. 497, on Sutures and Ligatures.)

It is well, also, to leave a sponge in Douglas' sac until after the sutures are passed. These are sufficiently long to be held up well out of the way by an assistant; and when all are inserted, the ends are separated and the sutures are relaxed

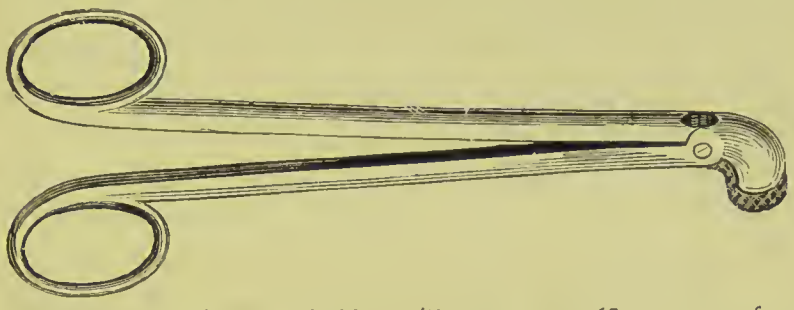


FIG. 458.—Wells' Needle-holder. (See pp. 245, 268, 337, 434, for various needle-holders.)

sufficiently to withdraw the sponges, and once more to permit the surgeon to examine the abdominal cavity. The wound is now closed, and the operation is completed, save the dressing. When the wound has been sponged with carbolized water and dried, it is covered with either iodoform, salicylic, or boric absorbent wool, kept in place by some strips of adhesive plaster.

If this dressing be carefully applied it answers well, and keeps the surface dry. It is retained by a light flannel split binder not tightly applied.

TREATMENT AFTER OPERATION.*—The room in which the patient is kept must be airy, and a temperature of 60° should be maintained. Two intelligent nurses, who can pass the catheter, and feed through the rectum, should be placed in charge. A second small bed is required to lift the patient on to, and any linen which is soiled should be immediately and gently removed. The quieter and more isolated the patient is kept, the better. She requires no visitors save her nurses and medical attendant. A hypodermic injection of morphia may, if the patient be very restless and there be pain, be given, or a full dose of bromide of potassium at night. The catheter has

* Consult p. 458, 'After-treatment—Cœliotomy.'

to be passed every six hours. *The routine use of opium and morphia after operation should be avoided. Vomiting within twenty-four hours after operation is best controlled by keeping the stomach empty.* With the exception of a few ounces of hot water given occasionally in the above period (ten or fifteen grains of soda bicarb. being added if there be any green bile in the vomit), the patient takes nothing. Thirst is relieved by rinsing the mouth with hot water. At first the food has to be of the lightest kind—milk and soda-water, toast and water, barley-water, water-arrowroot, thin gruel, beef-tea, chicken broth. Vomiting may be controlled by sips of iced water, iced barley-water, iced champagne, teaspoonful doses of bismuth and morphia mixture, and the administration of nutriment by the rectum. Flatus may be relieved by drinks of warm water, and the periodical passage of a large catheter or enema-pipe into the rectum. Sulphate of magnesia may be given in the manner already recommended (p. 459). The sutures need not be disturbed for a week, and the wound usually heals without any suppuration. The dressing is not, by some operators, changed for a few days. I prefer to dress the wound every other day. The drainage-tube is retained (if it be required) as long as we suspect any fluid accumulation. The sucker of Tait (Fig. 457) should be used both by the nurse and surgeon at intervals if there is any oozing or collection of sero-sanguineous fluid. Should we suspect the accumulation of fluid in Douglas' sac, a vaginal examination must be made, and it may be necessary to drain by the peritoneo-vaginal method. (See After-treatment of Hysterectomy, p. 458.)

After the sutures are removed, the sides of the abdomen should be supported by broad strips of adhesive plaster. Goodell first drew attention to the occurrence of parotitis after ovariotomy, and several other operators have since noticed its occurrence. It is not dangerous, though it may give rise to great discomfort, and end in suppuration. The occurrence of temporary mania has been noticed by different operators.

Fritsch, of Bonn, speaking of the causes of death after laparotomy at the German Congress (October, 1896), says:

'The most important organ was the peritoneum. In the peritoneum the physiological and pathological changes were very rapid. The time required for adhesion to take place was rather minutes than hours. Cocci were rapidly swept from the peritoneum into the blood and destroyed. But for cocci to become harmless three things were necessary. First, they must not be in too great a quantity. Secondly, an undisturbed circulation and a healthy heart were necessary; a lengthened operation, chloroform narcosis, loss of blood, and cooling, injured the circulation. Possibly, also, the hæmoglobin and the chemical quality of the blood had to be taken into account. Thirdly, the functions of the tissues—here the peritoneum—must be normal. The cooling was of less moment than the contact with the air and the altered pressure after opening the abdomen. The injury thus caused was often visible to the eye. The injury to the peritoneum was the greater the more roughly and improperly it was treated. Even without direct infection, the operation might be dangerous. It must not be forgotten also that cocci, accidentally introduced or coming through from the intestines, might, under these circumstances, find conditions suitable for their growth. Generally the weakened intestines recovered their tone in a few hours. If, therefore, after twenty-four or more hours the heart were strong, and the pulse good, there was no danger. But with a weak heart and a quick pulse the normal function of the bowel was not restored. He had shown, then, that, independent of infection, there were two conditions closely connected with each other that were dangerous—viz., weakness of the heart and injury to the peritoneal and intestinal functions. Avoidance of infection was not the only important thing, as had hitherto been represented, but the maintenance of the general and local power of resistance.

'*Patients on whom laparotomy had been performed did not die because they became septic, but they became septic because they died or whilst they were dying.*

'Myotomy was more fatal than ovariotomy, because it took longer; and with everyone the results became better as he learned to operate better.

'Now came the self-deception. Every operator adopted some peculiar method of procedure, and as he improved in an operation his results improved, until he came to believe that his good success was due to his peculiar methods, instead of putting it down to its true cause—his gradually improving dexterity. For himself his methods were really the best; whether for others was questionable.

'The correctness of his views could be tested clinically. The course in unfavourable cases was the following: The patient awoke after the operation already distressed. The breathing rather heavy; the bandage pressing heavily, otherwise the binding was well borne. The characteristic symptom was the cardiac weakness, the quick, feeble abdominal pulse that was always pathognomonic. The abdomen was distended, the countenance pale; there was thirst and vomiting was frequent; the temperature was normal; tympanitis increased, and the pulse became worse. These were the symptoms of ileus; but there was no ileus, nothing of obstruction. They were peritonitic symptoms; but there was no purulent peritonitis. There was no sepsis; there could be

sepsis without fever. These cases of which he was speaking often got well. With and without suitable treatment, the distressing symptoms ceased. If this was not the case, on the second or third evening there was slight fever, that increased *sub finum vitæ*. In any case, the most important symptom was the cardiac weakness, and not the fever.

'If his views were correct, at least for many cases, the conclusions to be drawn, as regarded practice, were: in cases of weakened or weak heart, in thrombosis after pneumonia, after influenza, etc., we should not operate, but wait. Before operation, debilitating preparation, such as starving or powerful purgatives, were contra-indicated. The *technique* must be good; the after-treatment very careful; washing out of the stomach, warm enemata, tonics subcutaneously, quinine, etc., were useful. A good *technique*, skill, and experience were very important as regarded results. It would be a good thing in gynæcology if a recognised *technique* could be adopted. A knowledge of the procedure fixed upon would do away with all doubts and loss of time. In the meantime the principle must make its way that lives were to be saved by careful selection of cases, good preparation, sparing (Schonend) operation, and careful after-treatment.'*

Ovariotomy during Pregnancy.

Dsirne (*Archiv für Gynäkologie*, Band xxiv., Heft 3) has collected 135 cases of ovariotomy performed during pregnancy, from the study of which he has drawn the following conclusions:

1. The complication of pregnancy with ovarian tumour is to be considered a very grave occurrence, in which, with few exceptions, the extirpation of the tumour comes into question.
2. The further pregnancy progresses, the more dangerous is the situation for mother and product.
3. The puncture of ovarian cysts and the production of abortion are to be considered only in emergency.
4. Ovariotomy gives the best results for the mother in the second, third, and fourth months of pregnancy; for the product of conception in the third and fourth.
5. If an early ovariotomy be not possible from various reasons, it is to be carried out in the later months of pregnancy, as good results can even then be expected.—*British Gynæcological Journal.*

Extra-Peritoneal Method.—I have not here entered into any description of the extra-peritoneal method of operating by clamp, or the clamp and cautery. Keith's great success was attained by this latter means. So was that of Sir Spencer Wells, in all his earlier operations; and there may be some cases in which it may still be deemed advisable to use the clamp in preference to the ligature. Its disadvantages are

* *Medical Press and Circular*, October 28, 1896.

that it is apt to drag on the uterus, to create a ventral hernia, to prolong convalescence, and increase the risks of septicæmia. Under any circumstances, it is better to combine ligature and clamp.

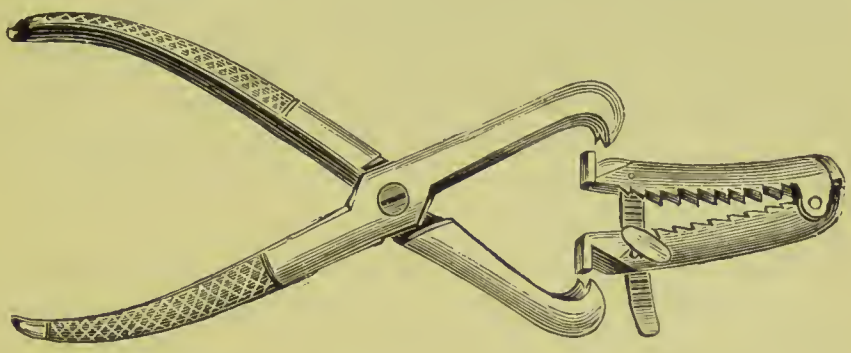


FIG. 459.—Pedicle Clamp and Forceps (Wells).

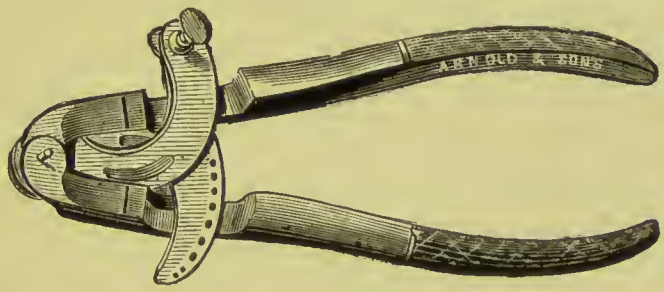


FIG. 460.—Wells' Pedicle Clamp.

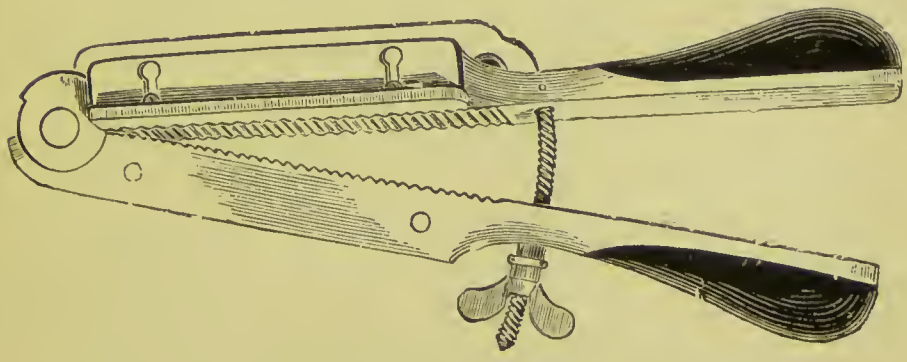


FIG. 461.—Cautery Clamp.

The time has passed for entering into the relative merits of the two methods. Those who desire a complete description of the use of the clamp should consult works already referred to, especially that of Sir Spencer Wells on the 'Surgical Treat-

ment of Abdominal Tumours.' I limit myself to the operation with which I am familiar, and which has quite superseded that of the clamp and cautery.

Fig. 459 shows Wells' clamp for fixing the pedicle in the wound, and Fig. 461 the cautery clamp. Such clamps are now almost obsolete. The side which is next the skin is protected with ivory as a non-conductor. The pedicle is cut off at about an inch from the clamp, and then seared with a dull heat flush with the surface of the blade. The pedicle, if all be right, is dropped into the peritoneal cavity.

Halliday Croom, in a case recorded at the Gynæcological Society (November 14, 1895), has noticed, in common with other observers, the presence of diabetes complicating ovarian cystoma, or resulting from the operation of ovariotomy. While the occurrence of diabetes during pregnancy is not so uncommon; its presence as the result of ovarian tumour, and following ovariotomy, is rather unusual. In the case in question, the tumour and the glycosuria stood in the relation of cause and effect. Some time after the ovariotomy, the sugar in the urine completely disappeared.

Halliday Croom did not believe that the sugar in this instance was solely dependent upon interference with the glycolytic function of the pancreas resulting from pressure of the tumour on that organ. It must also have been the result of interference with the hepatic circulation:

'A sudden relief of pressure, both local and general, in the abdomen, such as occurred at the operation, would act, not so much by stimulating the vaso-motor centres, as by causing a sudden dilatation of the large abdominal vessels, and consequent anæmia of the liver. This would explain the sudden but temporary fall in the amount of sugar secreted after the operation.' It must, however, be seen that pressure on the portal vein may cause diabetes. Glycogen may be stored in excess, or sugar be carried through into the hepatic veins, dependent upon the rapidity of the hepatic circulation. Pressure on the hepatic arteries may equally bring about

glycosuria. That nervous excitation, direct or reflected, may be the cause of glycosuria in ovarian disease, or after ovariotomy, is also to be remembered. The production of glycosuria after operation, in the case of a large ovarian cyst, is more likely to be due to the sudden removal of pressure and the consequent increase of rapidity in the hepatic circulation. The prolonged administration of chloroform will also produce glycosuria.

CHAPTER XXXVIII.

AFFECTIONS OF THE VAGINA.

Vaginismus.
Vaginitis.
,, simple.
,, cystic.
,, granular.
,, gonorrhœal.
,, diphtheritic.
Malformation.
Atresia.
Partial—Congenital and acquired.
Complete — Congenital and acquired.
Injuries resulting in cicatricial contractions and adhesions.
Syphilis.
Prolapse.
Tuberculosis.
Cancer.
Tumours—cysts.
,, —fibroma.
Foreign bodies.
Abscess in the urethro-vaginal septum.*
Varicocele of the recto-vaginal septum.†
Fistulæ.
,, vesico-vaginal.
,, urethro-vaginal.
,, urethro-vesico-vaginal.
,, vesico-uterine.
,, recto-vaginal.
,, perinæo-vaginal.
,, urethro-vaginal.
,, peritoneo-vaginal.

Vaginismus.—Vaginismus is one of those terms unfortunately employed to distinguish a disease, when in reality it should only be used as descriptive of a symptom that may be due to several morbid or abnormal conditions, both of the vulvar orifice and vagina. The spasm attending the vaginismus has been looked on by some as a 'neurosis of motion' (Matthews Duncan).

* See chapter on the Urethra. † See chapter on the Rectum.

And there can be no doubt that we find this symptom associated with morbid apprehensiveness of touch or intercourse in women whom we describe generally, if somewhat loosely, as 'neurotic,' or by the equally vague and general term, 'hysterical.' Hyperæsthesia of the vulvar outlet expresses more correctly what is generally termed vaginismus. The muscles said to be principally affected are the bulbo-cavernosi and the levator ani. But the entire muscular structure, voluntary and involuntary, including frequently the abductors of the thigh and the glutei, appear to be involved in the spasm. There is a state of extreme irritability of the nerves supplying the vulvar orifice and the vagina; and this irritability is often associated with a vascularity of the vestibule, and a condition that Tait has described as '*serpiginous vascular degeneration.*'

Causation.

Hysteria.
Vulvar hyperæsthesia (Tillaux).
Slight ulceration of the vulvar orifice.
Serpiginous vascular degeneration of the vestibule (Tait).
Fissures.
Disproportion between the size of the penis and the vaginal orifice.
Caruncle of the urethra.
Chronic vaginitis.
Chronic endometritis.
Coccygodinia.
Masturbation.*
Incomplete intercourse.
Uterine inflammatory states and morbid discharges.

It is frequently associated with

Amenorrhœa.
Dysmenorrhœa.
Uterine cervical catarrh.

* Scientific masturbation conducted *for* the patient under the guise of 'internal massage' is not unknown, and has recently in this country been the subject of criticism, rather at the eleventh hour. See chapter on Massage.

Hilton, and lately More Madden, have dwelt on the nerve supply of the sphincters (vaginal, rectal, urethral), and the part played by the common nerve supply of these orifices. It is urged that in vaginismus the lesion in the sensitive filaments of the internal pudic nerve, distributed to the vulva, vagina, and anus, is the cause of the reflex spasm and pain. There is an important anatomical defect, to which Hégar and Kaltenbach have drawn attention, that in itself may cause ineffectual intercourse, viz., the position of the vaginal orifice, which is placed too far forwards in consequence of too great pelvic obliquity. In some women the clitoris, also, is abnormally placed, and lying more in front, there is not the same natural sexual gratification as when it is in the normal position. Such women complain that intercourse has little or no pleasurable effect. Yet they frequently conceive and bear children.

Impotence in the Husband a Cause.—A patient, a few years since, consulted me, who gave the following history. She had married six months previously. Her husband never had a complete erection. This led to frequently repeated and futile attempts at intercourse. Of late any attempt at coitus produced the greatest pain. On examination I found a catarrhal discharge pouring from the highly irritable and vascular vulva. The general health had also deteriorated. On further inquiry I detected in the husband a spinal lesion, which explained the impotence. This is but an example of similar cases that I have from time to time seen, in which ineffectual and awkward coitus has gradually produced hyperæsthesia and irritability of the vulvar muscles. The same general condition follows upon intentional suppression of emission in order to prevent conception. (Consult chapter on Sterility.)

Fibroma of the Clitoris.—Some time since a patient consulted me for severe vaginismus and difficulty of intercourse. On examination I discovered springing from a hypertrophied clitoris a pear-shaped, fibromatous mass, which the patient stated had been there for years, but had of late grown larger. I removed this with the galvanic écraseur, and with subsequent dilatation she was rapidly cured.

Symptoms and Physical Signs.—The slightest touch, even with a feather, of the mucous membrane of the vulva, causes, in aggravated cases, pain and spasm. Examination with the finger is impossible. Sexual intercourse, at first painful, becomes ultimately intolerable, and all sexual desire is lost.

On examination of the external genitals we may discover in some exquisitely sensitive spot the source of the pain and dyspareunia. The margins of the hymen in married women may be hypertrophied. We may detect a fissure at the fourchette, some small ulcers about the hymen or near the urethral orifice, or an irritable caruncle of the urethra and general vascularity of the vulvar orifice. In any case of vaginismus where we cannot discover a local cause for the spasm in the vulva or vagina, a careful exploration of the rectum should be made. In most cases there is a rigidity of the sphincter ani—this chronic condition of rectal spasm Sims says is pathognomonic. We may find the source of the affection in some ulcer, fissure, or hæmorrhoidal state of the rectum or anus. In connection with this fact, it must be remembered that excessive sexual indulgence may predispose to a hæmorrhoidal condition of the rectum.

Diagnosis.—This is easily made, and the history of the case is of itself sufficient to indicate the affection.

Treatment may be divided into general and local.

The General Treatment consists of:

Avoidance of intercourse.
Change of air.
Sea-bathing.
Warm alkaline baths of soda and starch, using a bath speculum in the vagina.
Exercise. (Horse-exercise specially recommended.)

Administration of Tonics:

Bromides, with valerian.
Bromide and valerianate of zinc.
Attention to, and avoidance of a too stimulating, diet.

Local Treatment:

Warm vaginal washes of—

Perchloride of mercury (1 in 5,000).
Laudanum (℥i. in Oi.).
Chloral (gr. xx.—xxx. in Oi.).
Liq. plumb. subacetatis (℥i. in Oii.).
Tincture of calendula (℥ss. in ℥x.).

Suppositories—

Cocaine (gr. ii.).
Morphia (gr. i.).
Belladonna ext. (gr. ii.).
Iodoform (gr. v.).
Hyoscyamus ext. (gr. x.).

Lanolated Ointments of—

Cocaine (2·4 per cent.).
Belladonna (gr. xxx. ad ʒii).
Morphia (gr. v. ad ʒi.).
Atropia (gr. ii. ad ʒi.).
Iodoform disguised with coumarin (gr. xx.—ʒiv.).

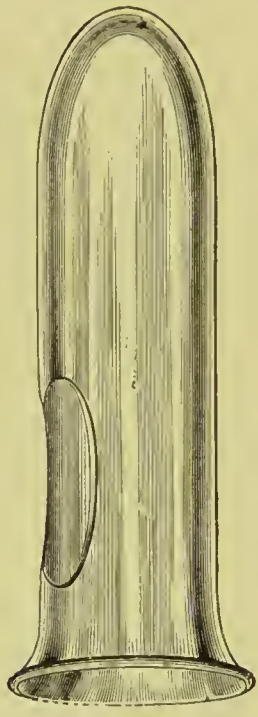


FIG. 462.—Sims' Vaginal Rest.

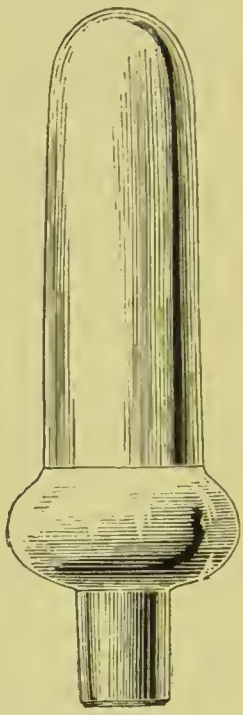


FIG. 463.—Solid Glass Dilator of Author (Mayer and Meltzer), made in three sizes.*

A vaginal dilator or rest may be worn at night, and also for some time in the day. It can be retained in its place by a perinæal bandage.

Medicated glycerine tampons may be worn at night, or chloral and cocaine.

The hot vaginal douche used night and morning, with alkaline, sedative, or astringent lotions added.

* These *solid* dilators I have found far preferable to the tubular ones. They are most useful in cases of painful coitus immediately after marriage.

Applications—

Cocaine (5—10 per cent.).

Carbolic acid (gr. x. ad ℥i.).

Solution of nitrate of silver (gr. xx.—℥i. ad ℥i. pencilled to the sensitive parts).

Nitrate of silver (the fused stick lightly touched to the sensitive spots).

Operative Measures.—To dilate the vagina, a diverging and conical Cusco's bivalve vaginal speculum with obturator, or Lane's speculum, may be used. The patient having been anæsthetized (generally this step is required), the vulvar orifice is dilated with the thumbs, and the speculum is passed. This is then forcibly dilated and fixed by the screw. It is left thus for some minutes. For a few days subsequently the speculum can be gently introduced and dilated. But of late I discard everything for my solid glass dilators. Sims' operation consists in ablation of the hymen and incision of the perinæal body. The first step of the operation is performed with a curved scissors; the second with a scalpel, two incisions being made through the vaginal tissue, one at either side of the mesial line of the perinæum, both meeting in the raphé. 'Each cut will be about two inches long, *i.e.*, half an inch or more above the edge of the sphincter, half an inch over its fibres, and an inch from its lower edge to the perinæal raphé.' The patient herself oils and passes twice daily the three sizes of the *solid* glass conical dilators, as shown in Fig. 463. The dilator is retained by a diaper for a little time. Sims' operative procedure will seldom be found necessary if the other means of treatment are carefully carried out, especially removal of the hypertrophied portions of hymen and systematic dilatation of the vagina. More Madden advocates Emmet's modification of Sims' operation—by means of the finger within the anus. The sphincter ani is pressed against the posterior wall of the vagina, and with a scissors the fibres encircling the vagina on each side are freely divided under the mucous membrane. Obviously, all special applications will fail if we do not recog-

nise and treat any diseased condition of uterus, vagina, or vulva which causes or complicates the vaginismus. The state of the urine* must be carefully inquired into, any uterine discharge attended to, any vascular urethral growths removed,

* To show the importance of examining the urine in cases of vaginal irritation, I here give the analysis of a few specimens selected from cases in which the irritation was unequivocally due to the urinary secretion :

URINE OF PATIENTS SUFFERING FROM SEVERE HYPERÆSTHESIA, PRURITUS VULVÆ, AND SLIGHT VULVITIS.

No. 6 was pale lemon-coloured, turbid, and deposited on standing a mixed sediment.

No. 7 had a similar colour, but was more turbid, and gave a larger deposit on standing a short time.

Their analysis gave the following results :

	No. 6.	No. 7.
Specific gravity	1016	1021
Reaction	Acid.	Acid.
Total solids, per cent.	3·70	4·90
,, urea, per cent.	1·14	1·82
,, uric acid, per cent.	0·05	0·06
,, acidity, per cent.	0·42	0·39
,, sugar, per cent.	0·01	0·005
,, phosphoric anhydride as phosphate ...	0·39	0·36
,, chlorine as chlorides	0·32	0·63

The deposit from No. 6 was isolated, and there were rosette prisms of ammonio-magnesium phosphate, hexagons of uric acid, mucus, epithelium, and débris.

The deposit from No. 7 was ammonio-magnesium phosphate, calcium phosphate, octahedral calcium oxalate, acicular uric acid, a few globules of fat, mucus, epithelium, and débris. G. B.

	No. 8.
Specific gravity	1026
Reaction	Acidulous.
Total solids, per cent.	6·11
,, urea, per cent.	1·42
,, uric acid, per cent.	0·08
,, acidity, per cent.	0·87
,, phosphoric anhydride as phosphate	0·55
,, chlorine as chlorides	0·54
,, sugar	0·03
,, albumen	A faint trace.

This 'evening' urine was excessively acid and super-phosphatic.

The deposit contained was octahedral, and dumb-bell forms of calcium oxalate, spheroids of sodium urate, rhombs of calcium phosphate, a few pus granules, mucus, epithelium, and urinary débris. G. B.

and small ulcerations and fissure of the vaginal orifice are healed. These cases are frequently cured by parturition. At times the essentially neurotic nature of the complaint is shown by the return of the symptoms after labour. But the proposition of Gaillard Thomas and Sims is not to be lost sight of, viz., in those cases where the marital act is impossible from the attendant pain, to thoroughly anæsthetize the woman, in the hope that complete connection, under these circumstances, may result in pregnancy. Mann, objecting to this suggestion, says that even if pregnancy occur in such cases it does not cure the vaginismus, which returns after it has terminated.

Urine of Patient suffering from Follicular Vulvitis.

Urine of patient suffering from chronic and recurrent follicular vulvitis, with severe irritation and pruritus:

Reaction	Acidulous.
Specific gravity	1021
Urea, per cent.	1·7
Sugar, per cent.	0·25
Albumen	A faint trace.
Acidity	0·032

The deposit contained abundance of vesical mucus and epithelium, a few pus granules, stellate or rosette masses of the acicular crystals of uric acid coloured with uroxanthin and fat globules.

The albuminous reaction of the urine may have originated from the serum of pus.

The sugar was estimated volumetrically by the ammoniacal copper test (Dr. Pavy's). G. B.

Urine of Patient suffering from Vaginal Hyperæsthesia and Irritation.

Specific gravity	1027
Reaction	Acidulous.
Total solids, per cent.	6·35
,, urea, per cent.	2·40
,, uric acid, per cent.	0·10
,, acidity, per cent.	1·17
,, sugar, per cent.	0·03
,, phosphoric anhydride as phosphates	0·89
,, chlorine as chlorides	0·42

The deposit consisted of sodium and ammonium urates, uric acid, ammonio-magnesium phosphate, mucus, epithelium, and débris.

A highly acid and super-phosphatic urine loaded with urates, and slowly changing into phosphates and free uric acid. G. B.

Vaginitis.

The cervical division of vaginitis into *constitutional* and *local* is most important from a practical point of view. It is natural that, in his anxiety to cure this troublesome and often obstinate local disorder, the practitioner should occasionally overlook the constitutional state behind it. Few there are who cannot recall to mind cases of vaginitis that have resisted active local treatment, and in which errors of diet or a disordered condition of the urinary organs has explained the obstinacy of the inflammation. The rectification of the constitutional error has been the first step towards the amelioration of the local irritation.

Varieties.—Vaginitis is :

Acute and Chronic.

Simple.
Cystic.
Granular.
Gonorrhœal.
Diphtheritic.

Simple Acute Vaginitis.

Causation.—In practice the first important point to decide is whether the vaginitis be a primary affection, or if it be secondary to either (*a*) any constitutional error, or (*b*) some local disorder in the uterus or bladder.

As a primary affection it owes its origin most frequently to :

Exposure to cold.
Traumatic causes.
Violent coitus.
Pessaries.
Caustics and irritants.

Pathology.—The vaginal mucous membrane passes through the ordinary stages of inflammation : increased vascularity, con-

gestion, and swelling. At first there is arrested, and secondarily an increased, secretion. This inflammatory state is attended by desquamation of the epithelium, and a secretion of mucus with pus. Frequently this stripping of the epithelium leads, from the irritation of accumulated acrid discharge, to ulceration. In patients whose general health is impaired, and who contract vaginitis through the irritation of purulent discharges from the uterus, membranes may form on the vaginal mucous surface of a diphtheritic character. These same croupous membranes are found in connection with the exanthemata. Adhesions and contractions may result, which almost completely occlude the canal—*adhesive vaginitis.*

Symptoms.—Acute vaginitis reaches a climax in from eight to ten days. It commences with a sense of heat and burning in the vagina, and a frequent desire to pass water. There is a muco-purulent discharge, which occasionally is fœtid. Pelvic and vaginal pain or perinæal throbbing follow. Scalding and smarting sensation during micturition, with excoriation of the vulva, are frequent attendants. The acid mucus secreted in chronic vaginitis is destructive to spermatozoa, and may prevent conception.

Cystic Vaginitis.

Occasionally small follicular cysts are found in the neighbourhood of the cervix uteri in either fornix. They are treated in the same manner as directed for the cervical follicles, incised and curetted. (See Cysts of the Vagina.)

Granular Vaginitis.

Causation.—In this variety a 'granular' condition of the mucous membrane follows the acute inflammation. The papillæ are enlarged; the mucous follicles also are hypertrophied. It is more commonly associated with pregnancy, but we frequently see a granular state of the vaginal mucous membrane where the inflammatory condition has arisen from gonorrhœal discharges, or where endometritis and cystitis have

complicated the vaginitis. I have also had cases in virgins in whom there was no reason to suspect unchastity as the cause.

Physical Signs and Symptoms.—If with the tubular speculum the vagina be cleaned out, and the walls wiped with cotton-wool, so as to remove all discharge as it is withdrawn, the rugæ will be seen enlarged and the recto-vaginal and vesical septa swollen. The rough, eroded, granular, dark-red, and, here and there, fissured appearance of the mucous membrane, is quite characteristic of this form of vaginitis. On wiping the surface of the membrane with a sponge or cotton-wool, in the earlier stages of the disease, we find that it bleeds readily. The os and external surface of the cervix uteri are frequently engorged and granular. There is considerable irritation; the patient awakes at night, disturbed by the itching, smarting, and heat. Pruritus of the vulva is often present to aggravate the other symptoms, and this is rendered more difficult to treat in consequence of the acrid discharge which comes from the vagina. The possible complication of cancer of the cervix must be remembered.

Gonorrhœal Vaginitis (*Specific*).

Few morbid conditions of the genital organs in a woman are attended with so serious and permanent consequences as gonorrhœa. Despite every care in treatment, the latent virus may from time to time give rise to a variety of pelvic disorders; and when we least suspect it, the gonorrhœal taint is the source of some obstinate affection of the ovary, Fallopian tube, uterus, or pelvic peritoneum. It is not so much on account of the immediate symptoms or distress that we have to regard gonorrhœa in the female as a serious affection, as from the remote results which for years after the disease is contracted may continue at irregular intervals to cause uterine and other pelvic trouble.*

* See Gonorrhœal Proctitis.

Results in the Annexa.

Pyo-salpinx following Gonorrhœa.—Edebohls (*New York Journal of Gynæcology and Obstetrics*, December, 1891) records the history of a patient who had specific urethritis set in four days after intercourse. Vaginitis, endometritis, and double salpingitis rapidly followed, the latter being diagnosed on the tenth day after infection. At the end of four weeks acute pelvic peritonitis occurred, and the enlarged tube was punctured and pus escaped. Five weeks after infection the appendages were removed. Section displayed a pelvic peritonitis, with abundant exudation, from which the left tube, containing about two drachms of pus, was readily detached, on account of its recent adhesions. The abdominal end of the tube was found to be widely distended, but glued to the wall of the pelvis. The appendages of the right side were also removed. There was no occasion for drainage, the abdomen was closed, and the patient promptly recovered.

Bantock has declared his belief that the effects of gonorrhœa, as exhibited in inflammation of the pelvic organs and uterine annexa, are greatly exaggerated. He repeated this at the meeting of the British Gynæcological Society. This is contrary both to the teaching of this work and the experience of the author. It is not a view shared by the majority of gynæcologists.

'A very common result of gonorrhœal salpingitis,' says Cullingworth (*British Medical Journal*, July 20, 1889), 'is the sealing up, by adhesive inflammation, of the fimbriated extremity of the Fallopian tube. When both tubes are thus closed, as they frequently are, it is evident there must be sterility. It is pretty certain that this is at least one of the reasons why prostitutes are so often sterile. But this sealing up of the free extremity is not the only or the worst effect of gonorrhœal infection upon the Fallopian tube. The whole mucous membrane lining the tube becomes inflamed and swollen, and a purulent secretion is poured out, which is liable to become encysted in the closed tube, or in portions of it, forming a pyo-salpinx, with its attendant miseries and dangers. In fact, pyo-salpinx appears to be generally of gonorrhœal origin. And it must not be supposed that only those women who lead an evil life become the victims of these internal inflammations of gonorrhœal origin. On the contrary, it is to their occurrence that the breakdown in health, following marriage, in previously healthy girls, is often traceable. The views of Noeggerath as to the latency and incurability of gonorrhœa have been treated with too much contempt. As to its incurability, no doubt he was wrong ; he himself has admitted as much. Nevertheless, the credit is due to him of having first drawn attention to the fact that a gonorrhœa in the male, supposed to have been long cured, may be roused by marriage into renewed activity, and so may be unwittingly transmitted to the wife.

'Acute gonorrhœa in the female is generally described as consisting mainly of an acute vaginitis. This, however, is not in accordance with ordinary clinical experience. It is even doubtful whether vaginitis occurs at all in the majority of cases ; if it should, it is usually slight in degree, and of very little importance. The lesion most constantly present is inflammation of the ducts of the vulvo-vaginal glands, and of the parts immediately surrounding their orifice. In a considerable number of cases there is urethritis, and not uncom-

monly there is redness with swelling, and, occasionally, superficial ulceration of the nymphæ. But a more frequent lesion than either of the two last-mentioned is inflammation of the cervical mucous membrane, with more or less catarrhal erosion on the portio vaginalis and a purulent discharge. It is this liability of the cervix to early infection that gives to gonorrhœa in women so serious a character; for when once the disease has established itself in the cervix, and it may do so at the outset, the infection easily travels, or is conveyed, to the interior of the corpus uteri, and thence to the Fallopian tubes, pelvic peritoneum, and ovaries, parts quite beyond the reach of local treatment.'

With all of these observations I entirely concur. I quote them here so as to support the view I have taken in past editions of the work on the ætiological importance of gonorrhœa as a potent source of pelvic disorders in the female.

Gonorrhœal Infection in Childbed.

Léopold (*Centralblatt für Gynäkologie*, 1893) insists on the possibility of the fever of childbed being originated by the gonorrhœal virus, which latter has been present previous to the confinement in the vaginal discharges. Thus the condition may arise quite independent of any vaginal examination.

Diagnosis.—This must depend on the history of the case, the examination of the husband, the intensity of the symptoms, and the transmission to the male from intercourse. It is necessary to lay special stress on the extreme care with which, should we suspect gonorrhœa in a married woman, we must investigate the case. The gonococcus of Neisser (*Merismopedia gonorrhœa*) should be sought for in the discharge.*

Two facts have to be remembered in practice, which have a most important bearing on the subject:

1. Other discharges in the woman than that of gonorrhœa may originate blenorrhœal discharge in the male. This is more likely to occur in men of a gouty temperament, and who may have had some latent urethritis existing, of a specific or non-specific nature.

'I have seen,' says Sims, 'many cases of urethral inflammation in the husband that were unquestionably contracted from the wife, who, however, had merely a leucorrhœa of an acrid character.' So has the author frequently.

Guérin explains the fact, well known in practice, that women who are apparently healthy, and who may fancy themselves to

* It will be remembered that the vaginal epithelium is hostile to the invasion of the gonococcus.—AUTHOR.

be so, often convey infection by the localization of the disease in the upper part of the vagina and the vaginal cul-de-sac.

2. As we may have little to guide us save the intensity of the symptoms and the urethral complication, without other collateral and confirmatory proof, sufficient to warrant a practitioner in coming to a conclusion, we must be more than ordinarily cautious in expressing an opinion that the disease is specific.

The attendant should judiciously frame an excuse for seeing either the husband or wife. And this can be done without letting either see that we suspect the disease is anything more than an ordinary attack of inflammation. Much here depends on the tact and discretion of the practitioner.

Symptoms and Physical Signs.—Every symptom of simple vaginitis is exaggerated. The onset of the attack is more severe. The discharge is more profuse and purulent. The local signs of inflammation are intensified, and there is greater scalding on passing urine. There is more swelling of the vulva. It may be excoriated, and the discharge tinged with blood.

The conditions to which gonorrhœa may give rise are:

Vulvitis and vulvar abscess.
Cystitis.
Metritis.
Endometritis (cervical and corporeal).
Salpingitis.
Ovaritis.
Peri-uterine phlegmon.
Perimetritis.
Sterility.
Bubo.

Treatment of Simple Vaginitis—Acute Stages.—Rest in bed; warm baths; vaginal injections containing borate of soda, Condy's fluid (℥i.—Oi.), laudanum, docoction of poppy-heads, belladonna (such warm injections are to be used gently and slowly). The bath speculum (Fig. 43) may be used in a warm sitz-bath, to which some carbonate of soda and starch

have been added, and this can be repeated three times in the day. The warm vaginal douche, to which a little laudanum is added, will be found to afford great relief. These douches can be used three times daily. The nurse or the patient herself can be taught how to secure some wool either on a uterine probe or speculum forceps, and, having smeared it well with some sedative ointment of morphia or belladonna, to apply it to the vaginal mucous membrane after the bath injection or douche. At night a medicated glycerine tampon of belladonna or hyoscyamus and cocaine may be used. This can be applied the last thing before going to sleep, and removed in the early morning. Later on in the affection, tannin (℈ii. ad ℥i.) may be added to the glycerine, and the tampon need not be disturbed for twenty-four hours. Sleep may be secured by bromide of potassium and chloral, a preparation of opium, or other hypnotic. The bowel must be kept free with a saline purgative. The diet should be non-stimulating, and alcohol altogether abstained from. If there be urethritis and vesical irritation, the oils of cubebs, copaiba, or santal, prescribed in emulsion, are of service.

R. Pulv. gum acaciæ, ℈i.
Ol. santal,
Ol. cubebarum, } āā ℈i.
Ol. copaibæ,
Liquor potassæ, ℈i.
Tinct. hyoscyami, ℈ii.
Elixir saccharin, ℈i.
Mist. amygdal., ad ℥viii.
Ft. emulsio. Take a tablespoonful three times in the day.

The infusions of juniper, uva ursi, and buchu may be taken. Diluent drinks and infusion of linseed should be given.

Second Stage.—The acute stage over, mild astringent lotions of sulpho-carbolate of zinc, sulphate of zinc, subacetate of lead, alum, boric, salicylic or tannic acid, and matico, can be used. Perhaps the best wash will be found to be that of perchloride of mercury (1 in 5000). This is used three times in the day. The warm douche should be continued, and the same sedatives used to allay irritation. Vaginal suppositories of cocaine,

belladonna, tannic acid, acetate of lead, or iodoform, may be worn at night. Any uterine complication should be attended to. If there be a fistulous opening into the vagina this should be closed. Should the disease prove obstinate, the vagina may be mopped out through a cylindrical speculum with a nitrate of silver solution or carbolic acid and glycerine.

Granular Vaginitis.

Edis spoke highly of carbolic acid (℥ii.—℥iv. ad ʒi. glycerine) in case of *granular vaginitis*. I have found excellent results from the use of chloride of zinc (grs. xxx. ad ʒi. glycerine). The vagina is first wiped dry, and all discharge is removed. Having so done, I prefer to pack the vagina with a tampon of dry absorbent cotton-wool. This is left in the passage for a few minutes, and then withdrawn. The vaginal walls are thus completely dried. A Fergusson's speculum is now introduced, and during its withdrawal the entire vaginal surface is swabbed with any solution we wish to use. Thus the greatest relief from the sense of pain, heat, and itching will be obtained by swabbing the vaginal walls once with weak solutions either of nitrate of silver or perchloride of mercury, ten grains to the ounce of the former and $\frac{1}{16}$ of a grain to the ounce of the latter. It is not necessary, save in rare and obstinate cases, to use very powerful solutions, or the strong nitrate of silver recommended. On the whole, save in very exceptional cases, *I think practitioners will do well to abstain from strong and heroic remedies in vaginitis*. The solid glass vaginal rest will be found a useful aid in dealing with this affection.

Treatment of Gonorrhœal Vaginitis.

There are some precautions which it is right to insist that the practitioner should specially observe in this form of vaginitis :

1. In the acute stage avoid any forcible injections; use simple soothing baths (Lawson Tait).

2. Before employing an astringent lotion, let the acute stage completely subside.

3. Attend to the rectum.

4. Keep the patient under observation for some time after the disease is apparently cured.

5. Remember the chronic and relapsing nature of the affection, the liability of the patient to attacks of endometritis and ovaritis for a considerable time, as well as the latent character of the gonorrhœal virus.

Great care has to be observed with regard to the rectum should there be any doubt as to the gonorrhœal nature of the attack. The bowel may be affected by contact with the discharges, or in placing any suppositories, and in the giving of injections. Should this unfortunately occur, rectal alkaline washes, to which some boric acid and hazeline are added, must be used.

ATRESIA OF UTERUS AND VAGINA.

Partial or complete closure of the uterine or vaginal canals or of the vulvar orifice may exist, either as a congenital malformation or an acquired condition. Partial closure of the uterine canal we are familiar with as 'stenosis.' Complete atresia of the uterus may be the result of closure of either the external os or internal isthmus. If there be closure of the lips of the uterine orifice, the entire uterus is generally distended, the walls being either hypertrophied, or, on the other hand, considerably thinned (Scanzoni). If the internal isthmus be closed, the cavity of the body is dilated.

Congenital Malformations.

Causes.—With regard to malformations of the genital organs, the student is familiar with the development of the canal of Müller and the Wolffian body, the kidney and ureter on the one hand, and the ovary on the other. He will remember that from the canals of Müller arise the Fallopian tubes, the uterus and vagina, which are at this embryonic stage double. A malformation of the uterus or vagina may be due to a defect of development in any degree of the canals of

Müller, whether that defect be due to simple arrest, a fault of fusion, or the suppression of either. We might thus classify the results of these embryonic accidents of development in the adult as follows:

Malformations of the Uterus.

(*a*) Complete absence of uterus; (*b*) rudimentary uterus; (*c*) bi-partite uterus, in which latter the neck may exist and the

FIG. 464.—Uterus Didelphys. The vaginal portion drawn from nature; the supra-vaginal portion semi-diagrammatic (A. E. Giles).

defect be in the body, or there may be an arrested development of the latter; (*d*) infantile uterus; (*e*) undeveloped body, with preternaturally long and tapering neck; (*f*) fœtal uterus, in which there is an advance and development on the last named.

Malformations of the Vagina.

Absence of, complete or partial; according to Pozzi, this rudimentary vagina is due to persistence of the vestibular canal, and arrest of development of portion of the vagina. Schroeder believes that when the middle of the vaginal canal persists, but is closed above and below, it is consequent upon an obliteration of one of the Müllerian conduits at the upper and lower end of the canal. Thus, whether the malformation

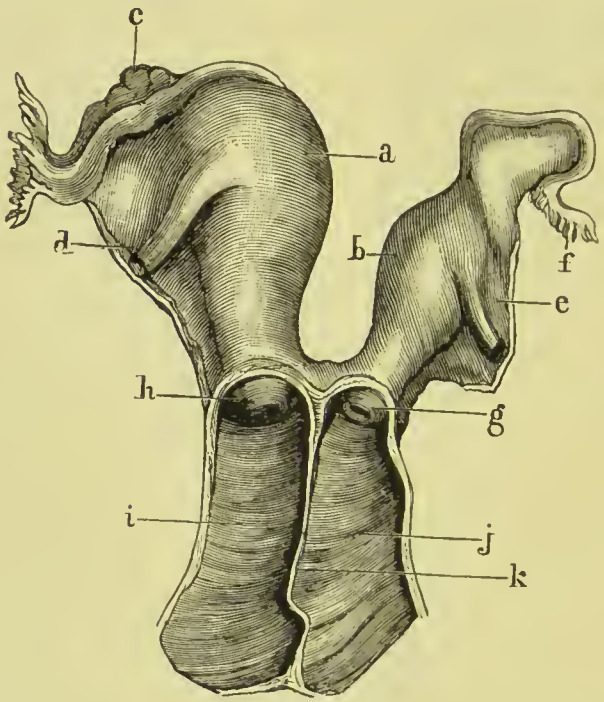


FIG. 465.—Didelphian Uterus-Vagina divided by a partial Septum. *a*, Right segment; *b*, left segment; *c*, *d*, ovary and right round ligament; *e*, ovary and left round ligament; *f*, Fallopian tube; *g*, left cervix; *h*, right cervix; *k*, septum of double vagina (*i j*) (Olivier).

assume the form of closure of the vagina, or a partitioning of this canal by a partial or complete septum, a double uterine orifice and neck, or any other variety of uterine abnormality, depends upon correlative deviations from the normal development of the Müllerian canals. The didelphian (Δις; δελφυς) malformation is that in which no fusion occurs, and in which each separate neck opens into its own vagina (Figs. 464, 465).

Malformations of the Hymen.

In referring to the hymen, Chapter I., pp. 9-11, I have already alluded to various abnormalities in its shape and structure.

Pozzi draws attention to the error that may be made in mistaking an over-development of the hymen as nymphæ, and thus concluding that the hymen is absent. But the most common form is the *labiate* (Brouardel). A slit separates two valves, passing backwards from the vaginal bulb in front. In the newly born, a bougie, with a diameter of ·0009 m., can be passed. This form may persist during life. In a child of seven years a bougie ·01 m. in diameter can be introduced, and in a marriageable girl the finger penetrates easily. Brouardel makes these observations (most important from the

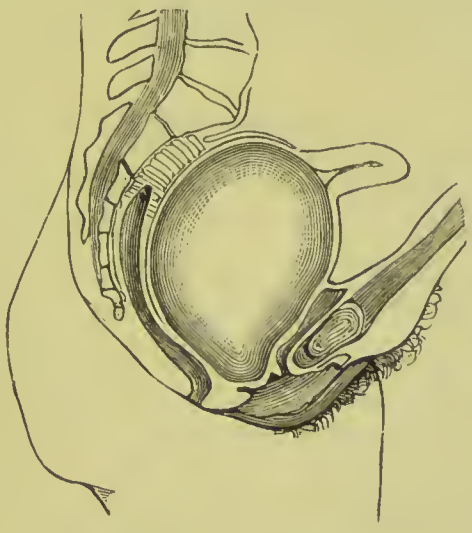


FIG. 466.—Hæmato-colpos, from Atresia of the Vagina.

point of view of legal medicine) on the hymen of young girls. During examination with the thighs separated the membrane is so tense that the finger cannot penetrate, but if they are approximated the hymen folds itself like a pouch and the posterior valve is depressed, the hymeneal orifice thus becoming larger and more distensile. Penetration offers no difficulty, and it is well to note that this applies as much to the penis of an accused person as to the finger of an expert.

For various anomalies in the position and form of the hymen, as also in its structure and thickness, the reader may well consult Pozzi's *Traité de Gynæcologie*, on the development and abnormalities of the hymen.

Forms.

Pozzi describes the following forms: (a) *annular;* (b) *circular (orificentral);* (c) *semi-lunar (orifice nearer upper border);* (d) *falciform;* (e) *fleshy (of various shapes);* (f) *fringed;* (g) *fundibuliform;* (h) *hypertrophic;* (i) *divided (and no openings separated by a partition);* (j) *cribriform;* (k) *columnated (continuation of the pillar of the vagina on the posterior surface of the hymen).* Pozzi states that in cases of atresia of the hymen, when it is said to be imperforate, it is simply joined to an adhesion of the vaginal walls (hæmatocolpos) which has imprisoned menstrual fluid and from which it is detached when this is evacuated (Matthews Duncan, Schroeder, Godfrey).

Among the anomalies of structure noted are (1) excessive thickness; (2) great rigidity; (3) vascularity. Pozzi considers that congenital absence of the hymen is a condition the occurrence of which is to be regarded with grave doubt.

Causation.

1. *Congenital.*—Various forms of *malformation of the genital canal* may exist, such as double uterus with imperforate hymen at one side, or absence of the vagina. Or the double uterus has one horn closed and there is a single vagina; other malformations and complications may occur, such as a hernia of the ovary (p. 755). If the vagina be congenitally absent, the uterus is often absent also.

2. *Acquired.*—The more common causes producing acquired atresia of the uterus are:

Parturition.
The use of caustics.
Operations on the cervix.
Cervical endometritis.
Senile atrophy.

Physical Signs of Atresia of the Uterus:

Absence of menstruation.
Presence of a tumour in the hypogastrium.

A uterine tumour felt through vagina, which gives a sensation of elasticity.

Impossibility of passing the uterine sound.

Symptoms.—The symptoms will be those which we have already considered as resulting from absence of menstruation. Also the patient suffers from the consequences of the occlusion of the genital canal and the local accumulation of blood. These consequences, immediate and remote (in cervical atresia), are :

Accumulation of blood in the uterus—hæmatometra.

,, ,, ,, Fallopian tube—pseudo hæmato-salpinx (*vide* Hæmato-salpinx).

Accumulation of serum in the uterus—hydrometra.

Perimetritis.

Pelvic hæmorrhage.

Vicarious hæmorrhage.

Rupture of the uterus or Fallopian tube—sepsis and septicæmia.

Atresia of the Vagina.—This condition is either *congenital* or *acquired.*

Congenital Atresia.—In *congenital* atresia, which is very rare, there is arrest of development leading to complete or partial absence of the vagina. The hymen may be imperforate. In many cases, though a superficial examination gives the idea of complete closure of the vaginal orifice, if care be taken a small aperture will be detected under the urethra, and through this the menstrual flow has escaped. In such a case of incomplete atresia, menstruation is frequently erratic in quantity and time of recurrence. A thorough examination of the condition can only be made by means of a finger in the rectum, and the sound passed into the bladder. The urethra may take the place of the vaginal canal, the os uteri opening into it.

Acquired Atresia.—The causes of acquired vaginal atresia are :

Vaginitis.
Parturition.
Injuries, burns, etc.
Syphilitic ulceration.
Caustics.

Physical Signs:

Absence of menstruation after puberty.
Absence of the vaginal canal.
Cicatricial adhesions in the vagina.
Imperforate or persistent hymen.
Bulging of the hymen.
Fluctuating tumour detected per rectum.
Presence of uterus ascertained by the recto-vesical examination.
Enlargement of the abdomen.
In the case of double vagina, there may be atresia of one vaginal canal, the other being permeable; a longitudinal vaginal tumour which is 'tense and fluctuating,' felt through the permeable vagina, and cylindrical in shape (atresia of the vagina, Schroeder).

Cullingworth has recorded an interesting case of retained menses, in which the vagina was occluded throughout its lower portion by a membranous structure which was not hymen. The vaginal wall was hypertrophied. He is of opinion that the obstruction in these cases is not at the hymen, but behind it; the hymen frequently lying on the obstructing membrane, and so closely adherent to it as only to be with difficulty recognised as a separate structure.

Symptoms (after puberty):

Periodical pain and tenderness in the hypogastric region.
Uterine colic.
Vesical irritation.
Retention of urine.
Abdominal tenderness.
Constitutional symptoms of amenorrhœa.
Vicarious hæmorrhage.

Symptoms of Inflammation and Internal Hæmorrhage from Retained Menses:

Cold skin.
Rapid pulse.
Rigors.
Vomiting.
Violent abdominal and uterine pain.
Elevation of temperature.

The principal dangers to apprehend are:

Perimetritis.
Peritonitis.
Pelvic hæmorrhage.
Septicæmia.

The retained blood is dark coloured, is of the consistence of treacle, and has no coagula.

*Treatment.—By aspiration or crucial incision.**—Much depends on the seat of the occlusion. Operative interference may be demanded: 1. To set free the imprisoned menstrual fluid; 2. To permit of sexual intercourse. In all operations for uterine or vaginal atresia the two principal dangers which have to be feared are:

(*a*) The admission of air, and septic changes in the fluid.

(*b*) The occurrence of uterine contractions, which may cause a retro-flow of the fluid through the Fallopian tubes.

To avoid the first danger, every antiseptic precaution, both before, during, and after the operation, should be taken to prevent the occurrence of septicæmia.

Aspiration.—To prevent the second complication, it is better to aspirate gradually, Bartlett's aspirator being used. If the uterus be distended with fluid, and the atresia situated in the cervical canal, not more than one-third of the fluid should be drawn off on the first occasion. A week may be allowed

* Christopher Martin has devised a very ingenious branched dilator, the blades of which, when closed, form a cannula; this contains a trocar that can be readily withdrawn after punction, and the fluid escapes through the cannula. Its special value is in pelvic suppuration and abscess.

to elapse before a repetition of aspiration; and this careful emptying of the uterus is continued until the entire fluid is removed. The vagina must be well tamponed after each operation.

Opening the Uterine Canal.—The operation for opening the canal of the uterus has to be performed with the greatest care. The vagina is thoroughly washed out with a hot solution of mercuric perchloride, and it is well to keep it tamponed for the twenty-four hours previously with iodoform wool. Gaillard Thomas's method is the safest. 'The cervix is steadied with a tenaculum, and a long exploring needle is passed into the uterine cavity. The sense of resistance once over, the escape of a drop of blood will assure the operator of his success in reaching it. Then putting into the gutter of the needle a delicate tenotome, he pushes it upwards to the required distance to open the canal. This section is repeated on the other three sides; the cavity of the uterus is syringed out with carbolized water, very gently forced from a small syringe; a glass plug is inserted in the cervix, and the vagina tamponed as after aspiration.'

Crucial Incision.—If crucial incision be determined upon, the plan I adopt is as follows: Through a small opening a self-retaining drainage tube is passed into the vagina, and the fluid is allowed to drain for some time—generally for an hour or more—into a large sponge wrung out of some antiseptic fluid, which is pressed against the vulva and retained there. When this is removed, a crucial incision is made in the hymen, and any fluid remaining is evacuated. The vagina is then douched out with a perchloride solution (1 in 3,000), and when thoroughly cleansed is tamponed with iodoform gauze. The following day the gauze is removed, and the vagina is again douched. This is repeated for some days, until all risks from any septic infection have passed.

Prolapse of the Vagina.

In discussing prolapse of the uterus and elongation of the cervix, it was necessary to refer to vaginal prolapse (see

page 250). It may, however, exist apart from any descent of the uterus. When the vaginal protrusion occurs as a primary affection, it is more likely to lead through traction to supra-vaginal elongation of the cervix than to prolapsus uteri. On the other hand, the three conditions, prolapse of the uterus, elongation of the cervix, and vaginal inversion, are frequently associated.

[*The reader will refer to the chapter on Prolapse of the Uterus, and he will there find discussed various correlative conditions and symptoms that are associated with vaginal prolapse.*]

Ætiology:

Old age.
Chronic vaginitis.
Operations.
Parturition.
Habitual neglect of the bladder and rectum.

Pathological Anatomy.—The relaxed anterior or posterior wall of the vagina, more commonly the former, protrudes into the vaginal canal, and drags with it, in its gradual descent, the bladder (cystocele) or the rectum (rectocele); an ovarian cyst may occupy the posterior pouch (ovariocele). The bladder or rectum may thus be carried down with the vagina, the former descending between the labia, the latter pushing the posterior wall of the vagina forwards, and finally effacing the perinæum, which merges into the prolapse. The orifice of the urethra may be visible on the anterior surface of the prolapsed mass; and the catheter must be passed in a downward direction to reach the cavity of the bladder. Small intestines may occupy Douglas' pouch, which is displaced downwards. Fœtid urine is apt to accumulate in the bladder, and fæces and gas in the bowel. All these abnormal conditions have been fully entered into in the chapter on Prolapsus Uteri.

Symptoms and Physical Signs.—The characteristic condition may be found in some old patient who has borne several

children. There is a sense of bearing down; some vesical irritation with incontinence of urine; the bowel is constipated. On examination the anterior wall generally (from the shape of the vaginal canal) is found protruding into the vagina, and forming here a soft tumour. If the prolapse should have lasted for any time, the tumour protrudes in front of the labia. The uterus is found by the digital and combined examination to be in its normal position, or perhaps somewhat lower in the pelvis. The catheter will detect cystocele, and the finger a rectocele. (See 'Prolapsus Uteri' for the symptoms and treatment of prolapse of the vagina.)

Operations for Closure of the Vagina.—In the operation of Amussat the steps are: (1) A catheter is introduced into the bladder, and held by an assistant, and the finger of the left hand is carried into the rectum; (2) a transverse incision is made through the integument, between the rectum and urethra; (3) the handle of the knife and the finger are used to tear open a passage to the tumour; (4) the tumour is opened with a trocar and cannula, a director is introduced through the cannula, and the latter is withdrawn; (5) a knife is used on the director to enlarge the opening. In Dupuytren's operation, an incision is made in the first instance transversely. With the finger and knife-handle, the tissues are then torn through until the tumour is reached. A trocar is plunged into it, and the fluid is evacuated. By means of a perforated sound the opening is enlarged, and the cavity is then washed out with a catheter, and some warm antiseptic water.

Cystic Tumours in the Vagina.—Cystic tumours are occasionally met with in the vagina. We must be careful not to confound such cysts with

Hernia.
Cold abscess.
Varix.
Cystocele.

These cysts are generally single. They are painless. They

give rise to little inconvenience, unless they are inflamed. Pressure does not affect the cyst as it would a hernial protrusion. If in doubt as to the nature of the cyst, a fine exploring needle may be used. The cyst generally contains a clear, glairy fluid. The treatment consists in evacuation of the contents, and removal of the entire or portion of the cyst-wall. The cavity can be treated with carbolic acid. If *sarcomatous tumours* are met with in the vagina, they must, like polypi elsewhere, be removed by the écraseur. Should *epithelioma* attack the vagina, it must be dealt with on the general principles recommended for the treatment of cancer of the womb.

Tuberculosis.—Tubercular disease of the vagina as a primary affection is exceedingly rare. The form is that of the miliary type, and the resulting ulceration assumes the usual character of ulcers surrounded by a zone of hyperæmic infiltration, in the centre of which is the characteristic grayish ulcer with cleanly-cut edge, the ulcer itself filled with caseous matter, under which lie the indolent granulations of which its base is composed. Where the vulva has been the primary seat of the disease, the lower part of the vagina is the portion affected; but if the infection spread from the uterus, or through its discharges, the posterior wall of the uterus and cul-de-sac is more frequently the seat of the disease.

Treatment.—For such ulceration, early excision of the ulcer, followed by the use of the cautery, or the free application of the curette, is the only rational treatment.

Vaginal Fistula.

It is not my intention to discuss minutely in this work the surgical treatment of all the urinary fistulæ.

I shall simply refer to the varieties of fistula and their causes, and conclude with a brief description of the operations for the two more frequently occurring forms, viz., vesico-vaginal and recto-vaginal.

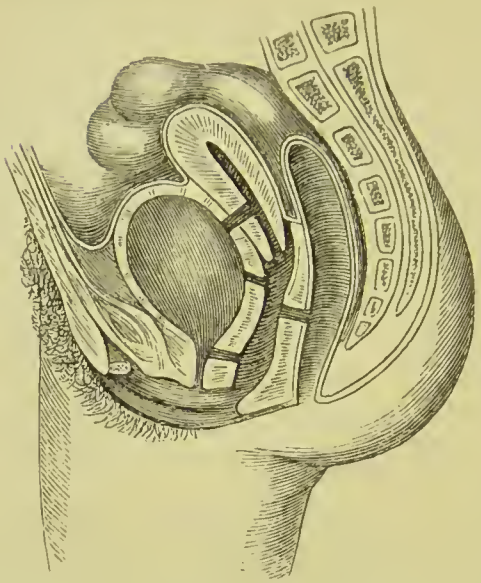


FIG. 467.—Diagrammatic Representation of Different Varieties of Fistula (after Siniéty).*

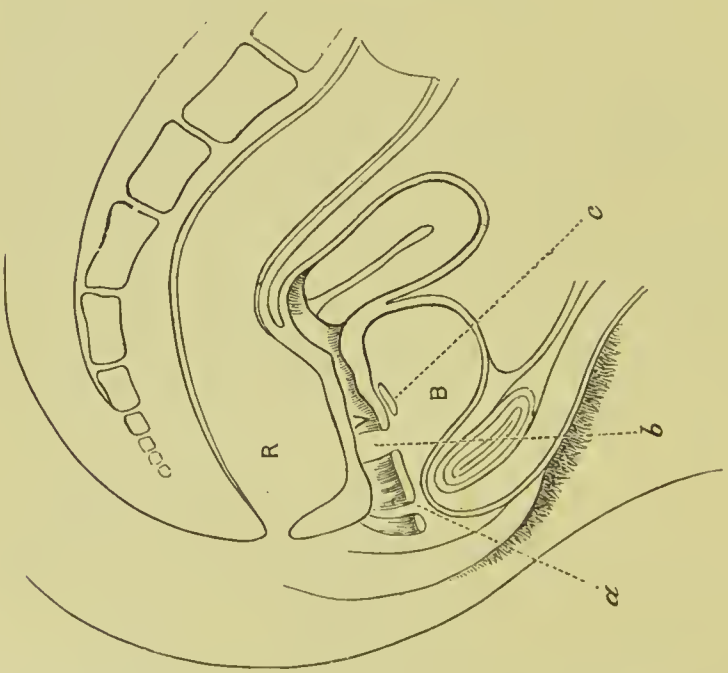


FIG. 468.—*a*, Urethro-vaginal fistula; *b*, urethro-vesico-vaginal fistula; *c*, vesico-vaginal fistula. R, rectum; V, vagina; B, bladder (Bozeman).

* See chapter on Affections of the Female Bladder.

Varieties :

Vesico-vaginal fistula.
Urethro-vaginal fistula.
Urethro-vesico-vaginal fistula.
Vesico-utero-vaginal fistula.
Recto-vaginal fistula.
Perineo-vaginal fistula.

Other varieties are described as uretero-vaginal, uretero-uterine, peritoneo-vaginal (Thomas). The names of these fistulæ indicate the organs involved.

Causation :

Parturition; most frequently protracted labour or the *improper* use of the forceps (*an instrument more often sinned against than sinning*) in cases in which it is contra-indicated by a conjugate, reduced below its working range, or when misdirected and unjustifiable force is employed—very rarely from the well-timed and skilled use of the instrument.
Vaginitis.
Traumatic causes.
Phagedæna.
Syphilis.
Cancer.
Stone in the bladder.

Symptoms and Physical Signs.—The urgency of the symptoms will to a great extent depend on the size and position of the fistula. But the principal ones are the involuntary passage of water or fæces by the vagina, and the excoriation of the skin and soft parts in consequence of this discharge. The fistulous opening is generally easily discovered with a Sims' speculum. Those are the most difficult to detect which are very small or slit-like, and are situated at the summit of the vaginal canal.

A minute opening may be concealed by a vaginal fold; and

it frequently requires very careful searching and cleansing with probe, hook, and cotton-wool to detect a small fistulous orifice.

FIG. 469.—Incarceration of Cervix Uteri in Rectum (diagrammatic section, $\frac{1}{8}$th size): knee-elbow position (Bozeman).

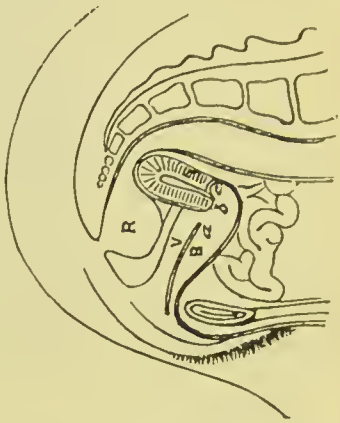


FIG. 470.—Incarceration of Cervix Uteri in Bladder; Posterior Lip shown in the Fistula (diagrammatic section, $\frac{1}{8}$th size): knee-elbow position (Bozeman).

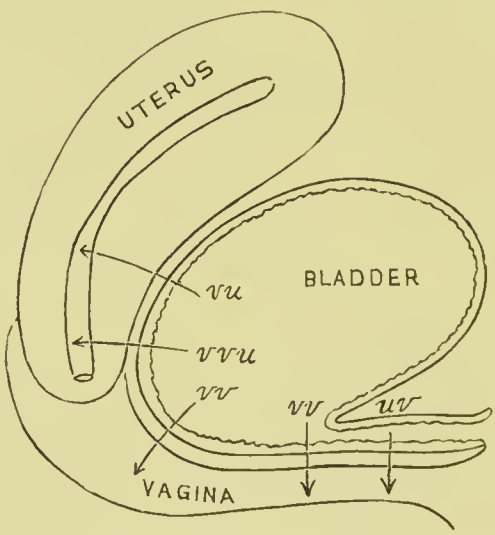


FIG. 471.—Genital Fistulæ: *vu*, Utero-vesical; *vvu*, utero-vesico-vaginal; *vv*, *vv*, vesico-vaginal; *uv*, urethro-vaginal.

Sometimes it may be necessary, in order to detect the orifice of the fistula, to inject the bladder with some coloured solution, as that of aniline or cochineal. If in doubt, place the

woman in the knee-elbow position, and let the vaginal canal be well exposed with Sims' speculum. Should any cicatricial bands contract the vagina, or if there be any atresic state of the genital tract, the diagnosis may be still more difficult.

Fistulæ differ in the extent of tissue destroyed, and the consequent size of the opening, which is sometimes so large that the entire base of the bladder is exposed. In a case I had under my care, some years since, this occurred, and there was also a recto-vaginal opening of sufficient size to admit the fingers. Fistulæ thus vary considerably in the amount of cicatricial tissue surrounding the edges. These latter are constantly covered with mucus and phosphatic deposits which require to be carefully wiped away to see the exact shape, direction, and size of the fistula.

The dependence of vulvitis and vaginitis on the presence of urinary fistula is not to be forgotten. Twice recently, in my practice, the obstinacy of vaginitis was explained by the detection of a small fistulous opening, situated at the junction of the vagina and cervix.*

Operation for a Vaginal Fistula.

Preparatory Treatment.—1. Sufficient time after parturition should in all cases be allowed to elapse—six weeks to two months, or even more, if the woman's health be not restored.

2. Change of air; a stay by the seaside; administration of tonics; warm vaginal douches; attention to the cleanliness

* Cullingworth has specially drawn attention to the occurrence of fistula in connection with chronic suppuration of the annexa, and he points out these typical forms: (1) Rectal fistula, due to the rupture of a suppurating dermoid into the rectum, six weeks after confinement. (2) Vaginal fistula, arising from purulent disease of the appendages of the right side. (3) Cervical fistula, due to ulceration of a suppurating dermoid into the cavity of the uterus in that situation. (4) Vesical fistula, arising from the rupture into the bladder of an abscess arising in connection with the appendages of the right side.

of the vagina, the character of the urine, and the action of the bowel.

3. Any tension of the sides of the opening must be previously attended to, and cicatricial bands divided by snipping these with scissors, a vaginal rest being inserted subsequently and retained for some days. By this previous operative step absorption of cicatricial tissue is secured and tension prevented.

4. The vagina should be douched with a 1 in 500° perchloride of mercury solution for a few days before operation, and a moist tampon of boracic wool, which is changed daily, is inserted and worn for some forty-eight hours previously. The rectum is thoroughly emptied and washed out with a boric acid wash shortly before operation. The exact steps of any operation for a vaginal fistula will entirely depend on its position, size, attachments to the bladder or rectum as the case may be, or whether it communicates with the uterus and the situation of the opening into the uterine canal.

Instruments and appliances required :

Sims' speculum.

Bozeman's or Simons' vaginal retractors.

Two long uterine tenacula.

Long-handled double hook.

FIG. 472.—Tubular Curved Needle, Right and Left.

FIG. 473.—Rectangular Needle.

Several vesico-vaginal knives (straight and angular).

A long rat-toothed forceps.

A few differently curved vesico-vaginal scissors.

Wire-adjuster and wire-twister.

Silver wire and gut.

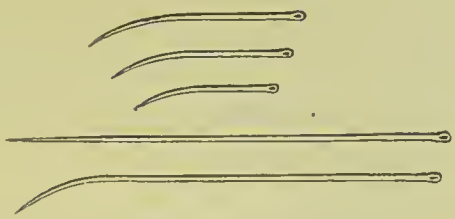


FIG. 474.—Emmet's Lance-headed Needles.

FIG. 475.—Vesico-Vaginal Fistula Knife, Straight.

FIG. 476.—Wire Guide.

FIG. 477.—Vesico-Vaginal Fistula Knife, Angular.

FIG. 478.—Vesico-Vaginal Fistula Forceps.

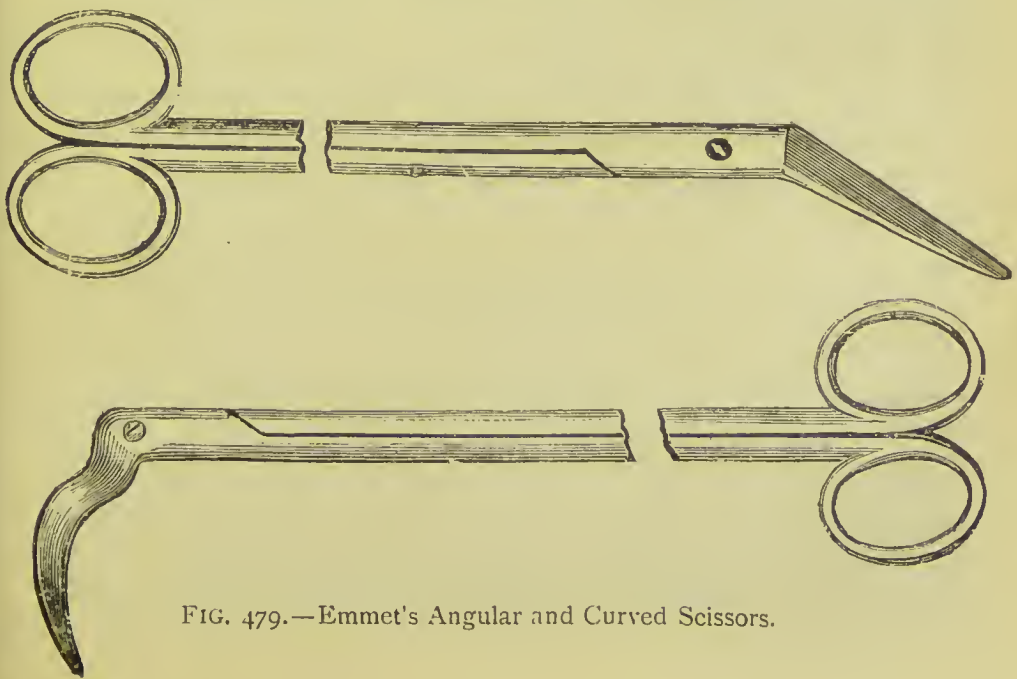


FIG. 479.—Emmet's Angular and Curved Scissors.

Several torsion forceps.
Several small sponges.
Vaginal douche.
Thigh-crutch or leg-support.
Bozeman's button-adjuster.
Several sponge-holders.
Short, straight, lance-headed, tubular, curved needles and needle-holder.

Operation for Closure of a Vesico-Vaginal Fistula.

First Step: Denudation of the Edges.—The patient is placed in a good light in the lithotomy or knee-elbow position, according to the situation of the fistula.

At least three intelligent assistants and a nurse are required. The speculum or retractors are taken charge of by one; the instruments by the second; a third assists the operator when necessary; while the nurse attends to the sponges and water.

The first step consists in freshening the edges of the opening by removal of a strip of mucous membrane from its entire circumference, taking care to extend the incision well into the angles of the fistula. The tissue where the knife transfixes the mucous membrane is hooked up on a tenaculum, and put on the stretch. By care, in most cases, the ring of tissue desired to be removed can be taken away in a single circular strip. The mucous membrane of the bladder is avoided. The broader the raw surface is on the vaginal side, the better. It may be necessary to use both curved scissors and knife in this step. Where the edge of the fistula is thin and bevelled, the operator has to split the edges or extend the denuded surface on the vaginal wall. Bleeding is arrested by very hot sponging, the hot douche, torsion, or possibly by gut ligature. If the precaution have been previously taken of dilating the vagina and rendering the uterus more mobile by division of any cicatricial bands, the cervix may be drawn down by the double hook, and the strain is thus taken off the edges of the fistula.

Second Step: Passing the Sutures.—The operator has ready at hand the tenaculum, strong blunt hook of Emmet, Emmet's lance-headed needles of the selected sizes, threaded at the ends with a loop of silk. Fixed on the loop is the silver wire. He

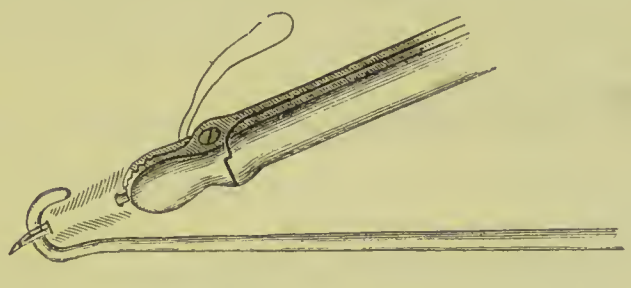


FIG. 480.—Showing use of Blunt Hook in passing the Suture (Emmet).

requires also a needle forceps and holder (see pp. 245, 268, 337). He steadies the tissue with the tenaculum, and with the needle-holder or forceps enters the needle at about a quarter of an inch from the margin of the wound, pushing it forwards until it appears in the opening, when it is seized and drawn through. It is now entered at the corresponding point of the opposite side, the vesical mucous membrane being again avoided, and the needle-point is made to protrude on the vaginal surface at

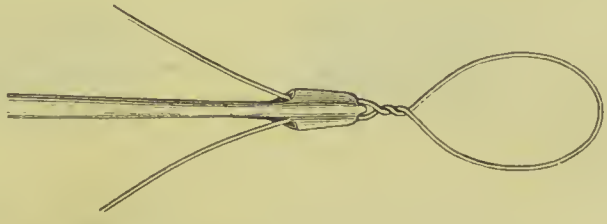


FIG. 481.—Wire-twister (Emmet). I prefer the ordinary wire-twister commonly used in the operation for cleft palate.

the same distance from the margin of the fistula. The blunt hook or tenaculum is used to make counter-pressure by passing it under the needle-point, while the latter is pushed through any dense or resisting tissue. The needle is again seized and drawn through with the silver wire. Sufficient sutures are then passed, generally about four or five to the inch.

Third Step: Adjustment of the Wound and Fixing of the Sutures.—When all the sutures are passed the operator again cleans the part of blood and arrests any bleeding from the pierced points. He then proceeds either by perforated shot, Bozeman's adjuster, or the wire-catch to tighten the sutures and carefully adapt the edges. In this step he is materially

FIG. 482.—Wire-catch.

FIG. 483.—Wire-twister.

aided by the wire-catch and twister. If he should simply twist the wire, he must be careful of the amount of tension he places on the sutures. Perforated shot or the Bozeman's adjuster will be found far better and safer.

After-Treatment.—A careful nurse is given charge. A Sims' self-retaining catheter is left in the bladder with a small tube

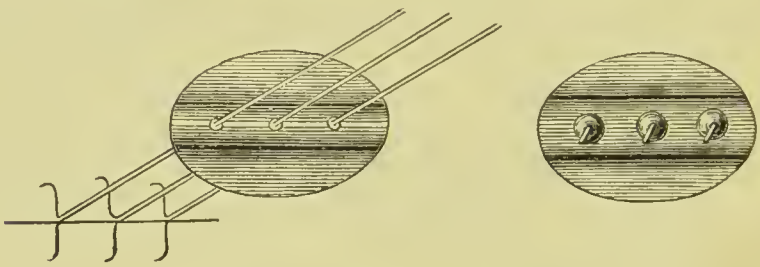


FIG. 484.—Bozeman's Adjusters.

attached* (see p. 265). A broad flat-bottomed cup is placed between the thighs. The patient lies on her back. The greatest care is taken as to the cleanliness of the catheter, which is withdrawn three times in the day and washed freely out by forcing a stream of carbolized water through it with a

* In my own practice I much prefer to have the urine drawn off at regular intervals by a nurse.

syringe. Any stoppage in the flow of urine is at once seen to. The catheter should be curved beforehand to the shape best suited to the individual case, and a second should always be ready at hand to replace the one removed, which is left in an antiseptic solution until required.

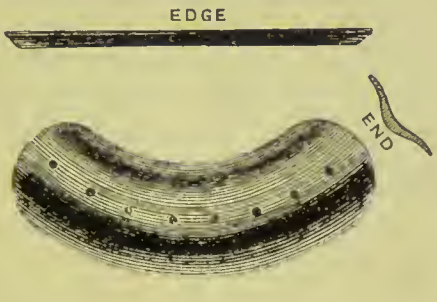


FIG. 485.—Shape of Button-adjuster used by Bozeman in closing a large Vesico-Vaginal Fistula.

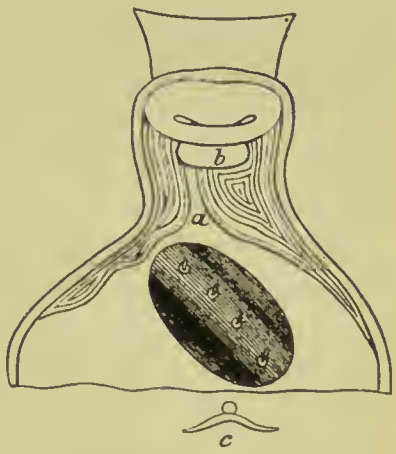


FIG. 486.—Showing Button Suture closing Fistula (Bozeman).

Opium is given to keep the bowel constipated. The vagina and bladder may be washed out with some mild disinfectant. The sutures are not removed until the tenth day, and an enema of castor-oil is given subsequently. The catheter is still used, and the woman is not allowed out of bed until the twentieth day.

Closure by Flap-splitting.

Ferguson* (Manitoba) has performed an operation for vesico-vaginal fistula on the flap-splitting principle.

An incision is carried through the vaginal mucous membrane at a distance of one-eighth of an inch from the margin of the fistula, which completely encircles the aperture. The operator cautiously deepens this incision until he reaches the lining membrane of the bladder. Thus a circumferential flap of the vaginal mucosa is secured. By inverting this flap into the bladder, a roof for the raw surface is obtained, and is held in this position by a continuous suture of fine chromic gut, which is inserted so as to avoid the vesical wall. Thus a narrow strip of vaginal mucosa becomes part of the lining of the bladder. The artificial

* *Brit. Med. Jour.*, February 24, 1894.

opening is now closed and water-tight, and the final step of the operation is the passage of silkworm gut sutures on the vaginal surface in the ordinary manner, the vesical mucosa being avoided.

Maclean suggests a plan for distending the bladder-wall in difficult cases of these higher vesico-vaginal fistulæ. Some eight or ten inches of rubber tubing are connected with an ordinary toy balloon by means of a short glass tube. The collapsed balloon is passed into the fistula through the bladder, and then distended with five ounces of warm sterilized water. The balloon is now drawn firmly into the fistula by means of the tubing, which is clamped. The freshening of the fistulous opening is thus facilitated.

Recto-Vaginal Fistula.

These fistulæ are, as I have already said, often very difficult to find. Their presence is only discovered by the escape of fæcal gas or matter into the vagina.

Cullingworth has specially drawn attention to the occurrence of fistula, in connection with chronic suppuration of the annexa, and he points out these typical forms: (1) Rectal fistula, due to the rupture of a suppurating dermoid into the rectum, six weeks after confinement. (2) Vaginal fistula, arising from purulent disease of the appendages of the right side. (3) Cervical fistula, due to ulceration of a suppurating dermoid into the cavity of the uterus in that situation. (4) Vesical fistula, arising from the rupture into the bladder of an abscess arising in connection with the appendages of the right side.

Whenever the edges of this fistula can be brought well together from the vaginal side, the operation of closing it should be performed from that side. The woman is placed in the lithotomy position. The rectum is thoroughly emptied and washed out with a warm solution of boric acid, and a sponge is carried to the sigmoid flexure so as to keep the part free of fæces during the operation. The steps are practically the same as in the vesico-vaginal procedure; but of the two the vaginal raw surfaces must be larger. It may be necessary to attack the fistula from the rectal as well as from the vaginal side. If so, the sphincters should be thoroughly dilated, and a smaller duckbill speculum used to expose the fistula. Sutures are thus introduced both from the vaginal and rectal sides. Goodell recommends the dissection of the vaginal mucous membrane for half an inch from the circumference of the fistula, in the form of a frill, which is inverted into the rectum, and the opening is closed both by rectal and vaginal

sutures. The bowels are locked for fourteen days after the operation, though some operators prefer a daily evacuation. The after-care is the same as in other operations of a similar nature.

Ferguson's Method.

As in the case of the vesico-vaginal plan, this surgeon obtains a circumferential flap from the vaginal surface, extending to, but not through, the mucous membrane of the rectum. The edge of the flap is seized with four pressure forceps inserted into the rectum, and a small pile-clamp is applied to it; the free portion of the flap external to the clamp is burnt off with the actual cautery. Interrupted sutures of silkworm gut are inserted and tied on the vaginal surface without grasping the mucous membrane of the rectum. The rectal clamp is then removed, a rectal tube wrapped with iodoform gauze is placed in the rectum, and the vagina is also packed with the same. Thus efficient coaptation of an extensively bared surface is obtained, resulting in ready union. The cauterization lessens the liability to septic infection, which is further guarded against by the iodoform packs. The rectal tube is not disturbed for a week, after which an enema is administered to secure an action of the bowels.

Vesico-Utero-Vaginal Fistula.

In vesico-utero-vaginal fistula, where the fistulous opening is in proximity to the cervix uteri, at the vaginal junction, the uterus must be freed from the bladder, and all cicatricial tissue dissected through, so as to free the uterus and render it movable. The shape of the denuded surface, and the direction in which the sutures are passed, will depend upon the size, shape and direction of the fistulæ. In the case of the vesico-uterine fistula, we may determine its existence by the injection of coloured liquid into the bladder, which will be seen escaping into the cervix. Should the fistula unfortunately be above the cervix, it may be necessary to open the abdomen, incise the utero-vesical fold of peritoneum, and separate the bladder from the uterus. The openings in the bladder and uterus are both freshened, and closed by interrupted silk sutures. Those passed in the bladder take in the whole wall with the exception of the mucous membrane. The bladder opening is first closed. Before closure of the wound, the peritoneum is restitched to the uterine wall. Such an opera-

tion is fortunately rarely called for. Other surgeons reach the fistula by incision of the vaginal roof, carefully separating the

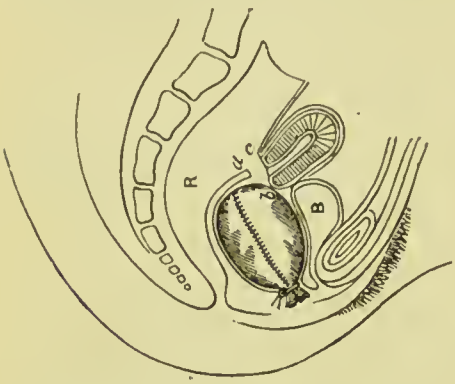


FIG. 487.—Dilator in position.

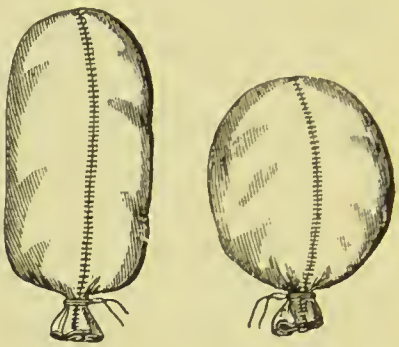


FIG. 488.—Vulvo-Vaginal and Intra-Vaginal Sponge Dilators (Bozeman).

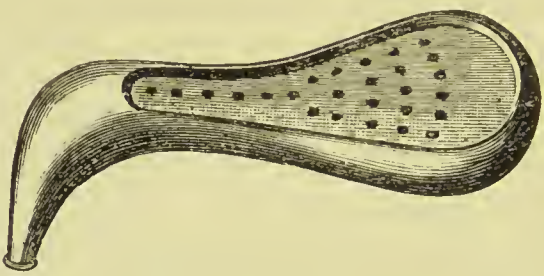


FIG. 489.—Utero-Vesico-Urethral Drainage Support. Entire length of instrument, 7½ inches; transverse of body, 2½ inches; length of body, 2½ inches; neck length, 2½ inches; width, 1½ inches; length of nozzle, from end of groove to its extremity, 2½ inches.

FIG. 490.—Utero-Vesical Drainage Support. Dimensions of instrument: entire length, 4 inches; length of body, 2 inches; width of body, 2 inches; thickness of body, ¾ of an inch; length of dish, 3 inches; superficial area of dish, 4 square inches.

bladder and uterus as far as the fistula, which is then closed by interrupted sutures, as in the last case, the uterus not being

interfered with. Iodoform gauze is carried up between the uterus and the bladder. The vagina is loosely tamponed with the same. Fistulæ occurring lower down in the cervix are closed by entire denudation, including the cervical tissue and the edges of the vesical opening. The fistulous track thus bared is closed by silkworm gut sutures, which are introduced from the vaginal surface of the cervix.

Bozeman adopts an ingenious plan for previous stretching of the cicatricial tissue and the uterine ligaments. He employs vulvo-vaginal dilators of different sizes, which are worn after division of the cicatricial bands and adhesions, and are made of hard rubber, of oiled silk, or *taffetas de soie*, filled with sponge. He thus gradually dilates the vagina, and proceeds with division of any cicatricial bands. The vaginal wall and the edges of the fistula are thus prepared for approximation. He has also devised a special drainage support, for draining off the water directly from the fistula, and thus prevents any passage of urine through the vagina for some time previous to the operation. The drainage support, of which there are two kinds, is connected by a tube with the urinal.

If we do not effect the stretching and cleanliness secured by the adoption of Bozeman's instruments, we can bring about the same result by the use of a colporynter in the vagina, and gradual stretching of the canal, while we carry out the preliminary division of the cicatricial bands.

Vaginal Enterocele and Varicocele.—Various authorities have from time to time reported cases of vaginal enterocele, but the complication is a rare one, and can only be relieved by operation.* Chéron describes a vaginal varicocele or a varix of the recto-vaginal septum, associated with hæmorrhoids, and causing pain in the lumbar region. He suggests treatment by upward massage of the varix.

* *Centralbl. für Gyn.*, Leipzig, June, 1894; *L'Union Méd. du Canada*, July, 1894; *Glas. Med. Jour.*, July, 1894.

Vaginal Bacteriology.

Some important investigations have been made by Stroganoff* on the presence of bacteria in the normal vaginal mucus. His experiments were made on rabbits and infants immediately after birth; also in cases from one to eight days after birth. He has also investigated the influence of the catamenia upon microbes in the vagina and cervix. The results of all his researches are important from the pathological point of view. Briefly, they are as follows:

(*a*) Pathogenic microbes do not find a favourable developing-ground in the vagina or uterine cervix. This immunity from pathogenesis is due to the action of the normal non-pathogenic microbes which are present from infancy. The mucus of the vagina does not act on the vegetable forms, but only on the spores.

(*b*) In the natural and healthy state microbes do not exist in the cervix.

Most interesting also are the experiments of Gow and Wills, the former having established the fact that a thick mucilaginous substance is secreted in the vagina, albuminous in character, devoid of mucine, with acid reaction before secretion, due to bacteria of a non-pathogenic nature; and Wills showing that the *Bacillus vaginæ*, devoid of pathogenic attributes, may be regarded as a semi-independent organism, secretory and protective. The normal reaction of the vaginal mucous is induced by its product, lactic acid.

---

* *Annales de Gynæcologie et d'Obstetrique*, March, 1894.

CHAPTER XXXIX.

AFFECTIONS OF THE VULVA.

Hermaphroditism.
Hypertrophy of the nymphæ and clitoris.
Hyperæsthesia (generally associated with vaginismus).
Erythema.
Erysipelas.
Eczema.
Herpes.
Pediculi.
Pruritus.
Lichen (extremely rare).
Lupus.
Oozing papilloma.
Rodent ulcer.
Epithelioma.
Medullary cancer.
Melanosis.
Elephantiasis.*
Syphilis :
- Primary syphilitic sores.
- Secondary syphilides.
- Condylomata.†

Vulvitis :
- Simple.
- Purulent.

Vulvitis—Phlegmonoid.
- Specific.
- Follicular.

Phlegmonoid inflammation of the labia majora.
Abscess.
Gangrene (noma).
Vegetations.
Cysts.
Varix.
Hæmatoma (hæmatocele, wrongly called thrombus).
Pudendal hæmorrhage.
Tumours :
- Elephantiasis.
- Pediculated.
- Sessile.
- Neuromatous.
- Sebaceous.
- Fibrous.
- Lipomatous.
- Sarcomatous.
- Cystic.

Hernia of ovary.
Hernia of intestine.
Hydrocele.

Atresia of the Vulva, congenital or acquired.—Congenital

* See p. 753.

† Tarnovsky (St. Petersburg) has described a true *trachoma pudendorum.*

malformation of the vulva may accompany hypospadias (absence of urethra) and other congenital anomalies of the genital organs. The vulva may, in very rare cases, be entirely absent, or it may permanently retain its infantile form. The labia majora or the nymphæ may be adherent, and, occasionally, the former are so united posteriorly as to present the appearance of an enlarged perinæum. The vulvar orifice is sometimes closed from the same causes that produce atresia of the vagina.

Hermaphroditism.—I do not here discuss the embryonic defects in development of the external organs of generation that cause the various malformations seen in the adult female. A few points are worthy of notice. Arrest of development of the genital tubercle, or its division, is associated with absence of the vulva or atresia of the vagina, while other deviations in the completion of the urethra, vagina, and anus, through the partitioning of the fœtal cloaca, lead to the various abnormalities found in the vulva, urethral orifice, and clitoris, resulting either in hypertrophy of the lips or closure of the orifices, both of the vulva and urethral meatus. In other cases, owing to similar arrest of development, the bladder, vagina, and rectum may open into a cloaca common to all three, or hypospadias may be the consequence.

In this latter state, in one form, while the clitoris is hypertrophied, there is a long vestibular canal into which the vagina opens; in the other, the allantois is entirely converted into the bladder, the urethra is absent, and the former viscus opens directly into the vestibule. Here the perinæal body is present.

Pozzi, in discussing the term hermaphroditism, denies that there is any such thing as a true hermaphrodite, the appearance of a double sex being due to these malformations referred to in the genital organs, which are arrested in the embryonic condition in man, or through the excessive development of certain parts in the woman, the greater number of pseudo-hermaphrodites being men afflicted with hypospadias. The test of sex in such cases must be the presence or absence of the testicles or ovaries, obviously most difficult in certain cases. Bearing on this, the following case of Martin is of interest:

Testicle in Inguinal Canal of Hermaphrodite.

Christopher Martin (Birmingham) showed a testicle removed from the inguinal canal of a hermaphrodite. The patient was twenty years of age, had been brought up as a girl, and earned her living as a nurse. She had never menstruated. Twelve months ago she was operated on by another surgeon for a right inguinal hernia, radical cure being performed. At this operation a solid oval body, supposed to be an ovary, was found in the sac, and returned into the peritoneal cavity. In January, 1894, she consulted Martin with reference to an inguinal swelling, which had formed on the left side. She also wished to know 'why she was never unwell like other girls.' Neither her features nor her voice were masculine. There was no development of beard or moustache. The breasts were flat and poorly developed. The figure was slim, but more suggestive of the female than the male sex. There was a distinct mons Veneris, but an entire absence of hair on the genitals. The scar of the previous operation was visible on the right side, but there was no hernial protrusion. In the left inguinal region was a small oval swelling, tender to the touch, and producing a sickening sensation on pressure. It was solid, and could not be reduced into the abdomen. There was no impulse on coughing. It was situated immediately over the external abdominal ring. The external genitals exactly resembled those of a nulliparous female. The labia majora and minora were normally developed. The clitoris was of the natural size; it was not grooved, and did not resemble a penis. On separating the labia the urethra was seen opening in the middle of a normal female vestibule. The vagina, however, was only represented by a short blind *cul-de-sac*, three-quarters of an inch deep, admitting only the first joint of the forefinger. No trace of a cervix or uterus could be felt. The urethral canal was about one and a half inches long, and was not surrounded by anything resembling a prostate. On introducing a sound into the bladder, and the forefinger into the rectum, no solid body like a uterus could be discovered intervening.

As the inguinal swelling gave the patient much discomfort, Mr. Martin decided to operate. He made an oblique incision over it, and laid open a serous sac enclosing an oval solid body about one inch long. This, on closer examination, proved to be a testicle, and the sac the tunica vaginalis testis. The gubernaculum testis was well marked, and passed into the tissues of the left labium majus. The testicle was freed from its surroundings, the cord isolated, ligatured, and divided, and the organ removed. The peritoneal cavity was opened at the upper end of the inguinal canal, the forefinger introduced, and the pelvis explored. No trace of a uterus could be felt, but the vas deferens could be traced—when the cord was dragged on—as a tense band coursing backwards, downwards, and inwards by the side of the bladder. The gland on the other side could not be felt. The patent inguinal canal was then closed with buried silkworm gut sutures, effecting a radical cure. The patient made an easy recovery from the operation, and has remained quite well.

Professor Allan, of Mason College, examined the organ removed. It had a well-marked tunica vaginalis testis. The epididymis arched around the posterior border of the gland, and the globus major, the globus minor, and the digital fossa were normally developed.

On section, the secreting tissue was enveloped in a tunica albuginea. Pro-

fessor Allan made a series of microscopic sections of the gland, which proved it unmistakably to be a testicle. The seminal tubules were shown in various stages of development, and in a few tubules imperfect spermatozoa were distinguished.

It is extremely interesting to note that the patient's sister—two years her elder—has never menstruated, has infantile breasts, has no pubic hair, has only a short *cul-de-sac*, one inch long, for a vagina, and no signs of a uterus. At the time of the conception of both the father was insane.*

Pozzi, denying the existence of true hermaphroditism, divides all forms of this malformation under three heads: (1) Partial

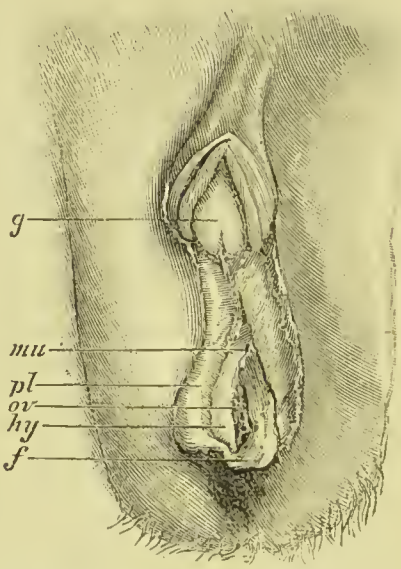


FIG. 491.—Pseudo-hermaphroditism, with perineo-scrotal hypospadias. *g*, Gland; *mu*, meatus urin.; *pl*, lab. min.; *vo*, vulvar orifice; *hy*, hymen; *f*, fourchette.

pseudo-hermaphroditism, subdivided into *gynandres* and *androgynes*; (2) complete pseudo-hermaphroditism, due to perineo-scrotal hypospadias; (3) so-called true hermaphro-

* In October, 1894, Martin removed from the right groin of the patient what proved to be the right testis. There was an excellent recovery. After the first testis was removed, hair began to grow on the pubes, and symptoms of hysteria developed. After the second was taken away, the breasts became swollen and tender, and were more fully developed. At the same time 'heats and flashes' were complained of, which recalled those of the menopause. Microscopic sections of this testis were also made by Professor Allan. From a communication from Martin just to hand, it appears that he has evidently concluded that in this case the true sex was *masculine*.

ECOLE DE MEDECINE CHIRURGICALE SOCIETE

ditism. In the first variety, *gynandri*, the appearances are due to hypertrophy and abnormalities of the external organs of generation in the woman, such as occur in the clitoris and labia. In the second, *androgyni*, we meet with men (monorchids or crypt-orchids) having certain external characteristics of the woman, as, for instance, excessive development of the breasts, and feminine characteristics in the genital organs, which give a feminine appearance.

In pseudo-hermaphroditism, rightly called, there is a perineo-scrotal hypospadias. There are individuals who have been

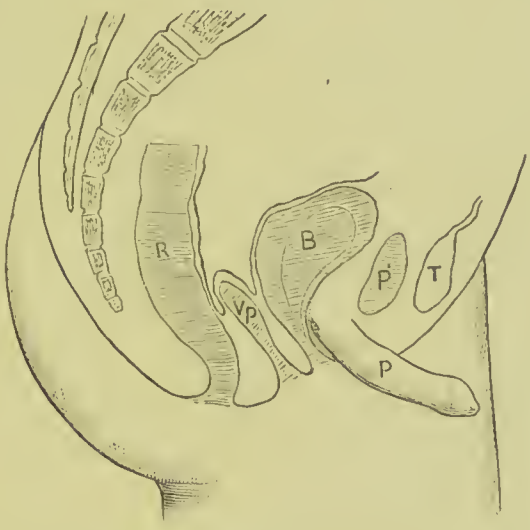


FIG. 492.—Pseudo-hermaphroditism, with perineo-scrotal hypospadias (Zweifel). *B*, Bladder; T, testicle; P', symphysis; P, penis (hypospadic); *pv*, prostatic vesicle and pseudo-vagina; R, rectum.

regarded from birth as women, but who have sexually rather the attributes of men. Coitus takes place through an enlarged urethral orifice, from which hæmorrhage occurs. This has been mistaken for true menstruation. In such hermaphrodites the hypospadias may give the appearance of a rudimentary vulva; the half-developed and hidden testicles secrete a sterile fluid. The feminine aspect is further added to by the mammary development, the small larynx and feminine voice, while the presence of a beard gives a sort of paradoxical contradiction to the otherwise female characteristics.

True hermaphroditism, divided by Cleps into *bi-lateral, uni-lateral, and lateral*, assumes the presence at one or both sides of an ovary and testicle, or ovaries and testicles. In the celebrated case of Catherina Hohmann, regarded by Rokitanski as veritable hermaphroditism, there was regular menstruation, and there were feminine characteristics. But in this, as in other cases, Pozzi and others doubt whether the condition was not due to those causes to which I have already referred.

Cutaneous Affections.

It is not possible in a work of this nature to attempt more than a brief description of some of the more commonly occurring cutaneous affections of the vulva. Cutaneous diseases attacking this part must be regarded as much within the province of the gynæcologist as the dermatologist. Local peculiarities being remembered, they must be treated on general principles and by the local measures we adopt for dealing with similar skin affections elsewhere.

It is my object to deal rather with those affections the clinical characteristics of which are materially influenced by the local anatomical and physiological peculiarities of this part.

Certain general principles must be observed in the treatment of cutaneous vulvar affections.

1. Inquiry into and attention to any predisposing constitutional condition, as, for example, hysteria, gout, struma, diabetes, or scorbutic tendency. Disorders of the urinary organs—cystitis, phosphates and uric acid in the urine—predispose to vulvar inflammation, as they do to vaginitis (see p. 692). A history of syphilis must be inquired into if the appearances indicate any specific taint.

2. Scrupulous cleanliness. Alkaline baths, local antiseptic washes of perchloride of mercury, salicylic, boric or carbolic acids, liquor carbonis detergens. Neutral and germicide soaps will be found useful.

3. The correction of any uterine, vaginal, vesical, or urethral affection, which, by an irritating discharge or otherwise, may prolong vulvitis.

Hyperæsthesia.—Gaillard Thomas has drawn special attention to this painful condition. We constantly see patients in whom we cannot detect the least abrasion or vegetation or irritable caruncle, and yet the introduction of the finger between the labia causes exquisite pain. Hyperæsthesia may attend on irritable urethral caruncle, painful vegetations, or the red patches described by Lawson Tait, and is occasionally met with where we have other manifestations of hysteria. It is the morbid condition most frequently associated with vaginismus. *The treatment* outlined by Thomas is that which I have found of the greatest service. This consists in: 1. Attention to the general health by restoratives and tonics. 2. The application of local sedatives and astringents, such as belladonna, opium or chloroform; painting the dry part with cocaine solution (10 per cent.); bismuth, iodoform, tannin, oxide of zinc, ichthyol, in the form of ointment; brushing the surface with weak nitrate of silver solution. (See treatment of vaginismus.) There must be complete rest from coitus.

Eczema of the vulva in women and young children is often associated with a similar state of the anus and gluteal region by extension. It is occasionally an evidence of a general debilitated condition due to some blood dyscrasia, occurring in lymphatic temperaments, or strumous constitutions; but it is more often due to local irritative discharges, or perhaps pediculi. The eruption is often of the impetiginous character; the part is hot, tender, and smarting. Pustules, vesicles, scabs, and excoriation of the skin and mucous membrane, follow.

Many leading dermatologists are agreed that eczema of a parasitic origin is specially worthy of remembrance in the case of the vulva, which partakes so largely of the conditions favouring parasitic growth. In fact, Eichoff prefers the name 'dermatitis parasitaria' to eczema, under such circumstances, or to Unna's 'eczema seborrhœicum.'

Treatment.—Any constitutional fault has to be carefully attended to and corrected. The new muslin dressing ointments of Unna are admirable applications in such eczematous

and other morbid vulvar states. These can be doubled so as to expose a surface of ointment to each labium, and retained thus in the vulva. They may be had of

Lead,
Carbolic acid,
Ichthyol,
Oxide of zinc,
Oxide of zinc and salicylic acid,
Oxide of zinc and thymol,
Thymol,
Boric acid,
Europhen,
Iodoform,
Iodol,
Arsenic,
Belladonna,
Chloral,
Camphor,
Creosote,
and
Mercuric perchloride,
Chrysophanic acid, Resorcin, } For use in the chronic stages of the disease.
Mercury.

Some of the washes already enumerated in the treatment of vaginitis will be found most useful, especially those of zinc and calamine, subacetate of lead, thymol, and sulpho-carbolate of zinc. It is in cases of eczema and pruritus that alkaline bathing and the correction of all acrid vaginal discharges are of such importance. The liquor carbonis detergens lotion, in the drier varieties, should be tried.

Lassar's Paste:

℞ Acidi salicylici, grs. x.
Zinci oxidi, P. amyli } āā ʒii.
Vaselini, ʒss.

Ihle's Paste:

Resorcini, grs. x.
Zinci oxidi, P. amyli, Lanolini, Vaselini, } āā ʒii.

Recommended by Graham of Toronto.—*Ann. Universal Med. Sciences*, 1893.

Herpes.—Herpes of the type of H. Zoster is found occasionally following in the course of the pudendal nerves. It must not be mistaken for a specific eruption. If a herpetic eruption occur on the vulva, it is an indication for the administration of such tonics as the mineral acids with bark and quinine, generous diet, and a soothing local treatment, as that indicated in the case of eczema. When the vesicles spread, and there is a tendency to pustulation, I find it an admirable plan to brush them over with a solution of nitrate of silver (grs. xxx. ad ʒi.), which is permitted to dry, and then a muslin

dressing may be applied. Outside the vulva the zinc (with calamine) lotion is a soothing application.

Pediculi frequently infest the vulva. In cases of eczema and pruritus they should be carefully looked for. It is necessary to use a lens for this purpose. The ammonio-chloride of mercury powder diluted with starch may be lightly dusted on the part, or the ointment of mercury or stavesacre rubbed in, or the perchloride of mercury lotion applied. One part of carbolic acid to seven of oil is a useful application.

Pruritus.—The practitioner must not fall into error in regarding pruritus as a primary disease rather than as a secondary affection of the vulva. Pruritus must be looked on rather as a neurosis, secondary to some constitutional error of nutrition, or a local disease in any part of the genital tract. The danger lies in the mistake of treating a symptom and neglecting the disease which originated it. We may thus divide the causes of pruritus of the vulva into constitutional and local.

J. C. Webster considers pruritus to be a subacute inflammation of the papillæ of the skin, and a progressive fibrosis of the nerves and Pacinian bodies, especially attacking the clitoris and the upper parts of the labia minora. It is in the main an inflammatory affection of the corium (*vulvitis pruriginosa*). Sänger (*Centralblatt für Gynäkologie*, February, 1894) considers that the lesion of the nerve-ends is not the primary cause of the pruritus, but a secondary change, resulting from a local affection of the vulva, due to the action of irritants from without. He maintains that there is no proof forthcoming that micro-organisms can induce the skin lesions. It is more probable that their presence is secondary to pre-existing local affections, and if micro-organisms were the primary cause of vulvitis pruriginosa, we should get this affection accompanying all cases of catarrh of the bladder. He subdivides the affection into two great groups:

I. Endogenous Causes.—(1) *Conditions of the blood.* Icterus, chronic nephritis, diabetes mellitus. (2) *Circulatory*

causes. Hæmorrhoids, heart disease, pregnancy, retroflexion, and tumours of the uterus (the latter by local obstruction to circulation). (3) *Skin diseases* (of hæmatogenous origin). Erythema, urticaria, herpes, eczema.

II. Exogenous Causes.—(1) *Secretory causes.* Hyperidrosis and seborrhœa, vaginal and uterine discharges. (2) *Parasitic causes.* Animal parasites: pediculi, oxyuris vermicularis. Vegetable parasites: leptothrix, oidium albicans, micrococcus ureæ. (3) *Mechanical causes.* Masturbation. (4) *Thermal causes.* Spring and summer pruritus.

Sänger advocates, in unusually severe and obstinate cases, the removal by operation of the diseased parts. 'The first operation for pruritus was performed by Carrard, in 1874; he removed only the clitoris, but a complete cure resulted. Since then similar operations have been performed by Chrobak, A. R. Simpson, Schroeder, Rheinstädter, Olshausen, and others. Heitzmann has obtained good results by scraping the affected parts. Sänger has himself recently performed the operation of excision in two cases, which he reports at great length. Both were obstinate cases, associated with chronic leucorrhœa, and had resisted all other methods of treatment. The general health of the patients suffered considerably from loss of sleep. Sänger in both cases excised the entire clitoris, and the labia majora and minora, and combined with this procedure repair of the perinæum. No difficulty was experienced in closing the wound, and after healing there was practically no visible deformity. Sänger considers that the removal of the clitoris has no effect upon the sexual appetite in women of middle or advanced age. In both of these cases the sufferings of the patient disappeared from the day the operation was performed. Sänger closes with the following propositions:

(1) The partial or complete excision of the vulva is a legitimate operation, which ought to be performed in chronic cases of vulvitis pruriginosa, which have resisted other methods of treatment.

(2) The clitoris may be removed without harm in all but young women.

(3) In young women, and in cases where the symptoms are localized to a part of the vulva, only the diseased portions should be removed.

(4) In older women, and when the vulva is extensively affected, the entire vulva should be removed, and the parts restored by plastic methods.*

It may be rightly objected that many of these local causes enumerated in the text only cause severe itching, not *true* pruritis. For clinical purposes I here group these incidental and often associated conditions in the consideration of pruritus generally.

Constitutional:	*Local:*
Gout.	Eczema.
Diabetes.	Lichen.
Gonorrhœa.	Leucorrhœal discharges.
Exanthemata.	Gonorrhœal ,,
The menopause.	Flow of diabetic urine.
Pregnancy.	Cystitis.
Senile changes.	Vulvitis.
Hysteria.	Vaginitis.
Bright's disease.	Ascarides.
Alcoholism.	Pediculi.
Gastric and hepatic derangements.	Vegetations.
(Of these, diabetes, alcohol, pregnancy, and gastric derangements are the most frequent.)	Urinary fistulæ.
	Hæmorrhoids.
	Uncleanliness.

In many severe cases of pruritus there is a total absence of all organic change in the skin, and the irritation is due to a derangement of the stomach, liver, or rectum. In a great many instances, however, the excoriation and accompanying eruption are secondary consequences of some irritating discharge, and the tearing of the skin by the nail in scratching.

Treatment.—The practitioner, on first seeing the case of pruritus, should inquire carefully into the origin and history of the disease. His success in overcoming the obstinate, and at times intractable, itching will depend on the discovery of the

* *Brit. Gyn. Jour.*, February, 1894.

cause, whether constitutional or local, which has brought on the pruritus. Gouty and diabetic states must be dealt with according to general principles, both therapeutical and dietetic; the character of the urine should be ascertained, and any abnormal condition of this secretion rectified as far as possible. The diet has to be carefully regulated. Alcohol, according to circumstances, should either altogether be forbidden or taken in the most moderate quantity. Sufferers from pruritus should avoid too stimulating a diet. Tea and coffee must only be taken in moderation. Food should be simple and plainly cooked. Pastry, fats, rich soups, sweets, cheese, shell-fish, saccharine vegetables, and fermented drinks, should be avoided.

Saccharin in diabetic and gouty cases is a most valuable substitute for the ordinary carbo-hydrate sugar. Less than a grain will sweeten a small cup of tea. It is 300 times sweeter than cane-sugar. It passes quite unchanged into the urine, and is both antiseptic and disinfectant. It may be obtained of any chemist in the form of a pellet or soluble powder (paper by Author: *Medical Press and Circular*, October 10, 1887).

In hepatic derangement, the administration of a mild mercurial preparation a few times in the week at night, in combination with a vegetable cholagogue, followed by the administration of a saline water the next morning, such as Rubinat, Hunyadi Janos, or Victoria water, will be of service. The Carlsbad salt in powder or crystal, dissolved in warm water, is beneficial. Such spas as those at Vals, Vichy, Ems, Homburg, Carlsbad, Kissingen, Bourboule, Cauterets, Aix-les-Bains, Harrogate, Bath, Cheltenham, Strathpeffer, can be recommended according to the type of case.* During pregnancy the patient may take suitable soothing baths, and use such local remedies as some of those in the subjoined list. The leucorrhœal discharge of pregnancy should be attended to. If there be constitutional syphilis, it must be dealt with by specific remedies, both general and local. Arsenic will be found of service in many cases.

* Sec chapter on Health Resorts.

Kraurosis Vulvæ.—Briesky, Orthmann, Martin, and Sänger are the principal authors to whom we owe our knowledge of this affection. It does not appear to have any microbial origin, nor is it associated with any venereal affection. The nerve-ends are not changed as in pruritus. It is a question, according to Sänger, if it be not a form of atrophic change in the vulva, preceded by an inflammatory state. It is not peculiar to women of any age, nor has married life anything to say to it.

Symptoms.—There is usually itching, but this symptom is not invariably present, being absent when there are serious atrophic changes in the nerves. The swelling and feeling of tension are followed by fissures, and subsequently atrophic changes in the tissues of both labia and the clitoris.

Local Treatment of Pruritus.—The first care of the physician will be to endeavour to rectify any uterine, vesical, or rectal affection that may complicate the pruritus.

Much benefit will be derived, in some cases, from the use of soothing alkaline and starch baths. But to this there are exceptions; and baths occasionally appear to do more harm than good.

The three baths I prefer are:

1. Bran (2 lb.), potato-starch (½ lb.), gelatine (1 lb.); water at 100°—105°, 25 to 30 gallons.

To this a few gallons of decoction of marsh-mallow may be added. The bran and marsh-mallow water can be first prepared, and added to the bath subsequently.

2. Carbonate of sodium (℥ii.), hyposulphite of sodium (℥ii.), potato-starch (℥iv.); water at 100°—105°, 25 to 30 gallons.
3. Liq. carbonis detergens (Wright's), ℥i.—℥ii. to the gallon.

In ordering any *hot* bath for a female patient, the periods must be remembered, and their regularity inquired into. *If there be suppression of the menstrual flow and accompanying head-symptoms, such as headache, disturbances of vision, tinnitus aurium, hot baths should not be taken.* Such soaps as larch-soap (W. Moore, of Dublin)—which is composed of wheaten bran, glycerine, white curd soap, and extract of larch-bark—sulpho-

line soap, molfa (Dinneford), vinolia, and carbolic or tar soap, may be used with the bath. A glycerine or medicated tampon, or pessary, can be introduced after the bath. (The bath speculum is shown at p. 56.) The vaginal rest may be worn, and the lips of the vulva separated by a piece of folded linen or cotton-wool, smeared over with any sedative ointment, or the muslin ointments before referred to can be prescribed, and these may be kept in position by a light perinæal bandage or a napkin.

The local remedies which will be found of use either in washes or ointments to allay *itching* have been already enumerated. Those I attach most value to are :

In lotion—

Hydrocyanic acid (min. v.—ʒi.).
Perchloride of mercury (1 in 2,000—1 in 5,000).
Tobacco, as infusion (ʒi.—Oi.).
Solution of subacetate of lead (ʒii.—ʒx.).
Chloral (gr. x. ad ʒi.).
Cocaine (5—10 per cent. solution).
Chloroform (1 pt. to 7 of oil).
Menthol (1 pt. to 7 of oil).
Liq. carbonis detergens (ʒi.—ʒviii.).
Ext. hamamelis liq. (ʒi. in ʒviii.).
Walnut leaves (decoction of).
Calomel (lotio nigra).

In ointment—

Salicylic acid (grs. xx. ad ʒi.).
Pyroligneous oil (ʒi. ad ʒi.).
Cyanide of potassium (gr. ii.—gr. v. ad ʒi.).
Morphia (gr. v. ad ʒi.).
Cocaine (gr. xx. ad ʒi.).
Belladonna (gr. x.—xx. ad ʒi.)
Oleate of mercury and morphia (lanolated).

Neisser strongly recommends *tumenol* as anti-pruritic in eczematous states and in prurigo. He uses the remedy either as a paste (5—10 per cent. of the powder with starch) or as an ointment. He gives this form (*Deutsche Medicinische Wochenschrift*, Leipzig, November 5, 1891) :

℞ Tumenol, ʒii ss—v.
Pulo-zinci oxide, āā ʒii ss.
Bismuth salint ungt. linepæan, ʒvi. (*Lib. cit.*)

Many of these remedies must be used with caution, especially if there be abraded surfaces, as, for instance, cocaine, perchloride of mercury, belladonna, cyanide of potassium, morphia, hydrocyanic acid. The exact quantity to be applied should be stated in the prescription.

For the itching of diabetes Goodell strongly recommends the salicylate of sodium, in 15-grain doses, every fourth hour (Simpson, Philadelphia). Bromides and chloral, tuonal, sulphonal, chloralamid or urethrane may be given to secure rest and sleep.

The following astringent and antiseptic applications will also be found most valuable in various cutaneous affections of the vulva in the strengths indicated.

Oxide of zinc }
Calamine } (ʒss.—ʒviii.).
Biborate of sodium (ʒii.—ʒviii.).
Carbonate of sodium (ʒii.—ʒviii.).
Acetate of lead (gr. ii.—gr. iv.—ʒi.).
Solution of the subacetate of lead (ʒii.—ʒviii.).
Sozo-iodolate of sodium (ʒii. in ʒviii.)
Sulpho-carbolate of zinc (gr. iv.—ʒi.).
Thymol (1 in 500 to 1 in 1,000).
Chaulmaugra oil with almond oil.
Camphor and borax (liq. camphor. concent. ʒii., borax ʒiv., in ʒviii., with or without glycerine).
Nitrate of silver (gr. xxx.—ʒi. ad ʒi.).
Carbolic acid (gr. xxx.—ʒi. ad ʒi., or equal parts of carbolic and glycerine).
Chromic acid (gr. xxx. ad ʒi.).
Chloride of zinc (gr. xxx.—ʒi. ad ʒi.).

And as ointments—

Benzoate of zinc (ʒi.—ʒi.).
Oxide of zinc (ʒi.—ʒi.).
Chloroxide of bismuth (ʒii.—ʒi.). These may be combined.
Glycerole of lead (ʒi.—ʒi.).
Oleates of lead and zinc (ʒss.—ʒi.).
Sozo-iodol (ʒi. ad ʒi.).
Iodol (ʒss.—ʒi. ad ʒii.).
Iodoform (disguised with fresh coffee, equal parts, vanillin or coumarin, gr. v.) (ʒss.—ʒi. ad ʒi.).
Pyroligneous oil of juniper (alone or in combination, varying strengths).

The use of any of the remedies here enumerated, whether alone or in combination, will depend on the *nature* of the eruption, its *stage*, and the indication for a soothing, astringent, stimulating, or detergent application. It is wrong to commence with too powerful an application. Better, in most instances, to begin with a mild lotion, and increase its strength according to the toleration of the part.

Where there is a raw or moist surface of the skin the lotion of zinc and calamine (Wilson) will be found most useful. To this either carbolic acid, or thymol, or hydrocyanic acid may be added. It can be used with a fine sponge. The powder dries, and can be washed off before fresh lotion is applied.

℞ Zinci oxidi, ʒii.
Calamine pur., ʒiv.
Glycerine, ʒii.
Aq. rosæ, ʒviii. Ft. lotio.

℞ Solutio ichthyol (10 per cent.), ʒiv.
Ol. Chaulmaugræ, ʒii.
Lanolini, ʒi.
Aq. rosæ, ʒi.
Ung. benzoat., ʒiv.

The ointment to be applied to the part after the alkaline or tar bath. The latter for a full bath is made of the strength of ʒi.—ʒii. of the liquor carbonis detergens to the gallon of warm water.

When the inner surfaces of the labia or nymphæ are sore or swollen they should be separated by some emollient dressing—the muslin dressing of Unna may be used—or a piece of linen can be folded and placed between them, or cotton-wool. The linen or wool can be covered with any application we may wish to employ.

Local Syphilitic Remedies.

These are the more useful specific applications in syphilitic vulvar affections:

Calomel wash.
Oleate of mercury and morphia.
Calomel vapour baths.
Iodoform insufflated.
Sozo-iodol and its salts (ointment or wash).
Iodoform ointment.
Europhen.
Iodol insufflated.

Iodol ointment.
Mercurial (mild) ointment.
Ointment of calomel with bismuth.
Iodide of starch (ointment and powder).
Picis liquid. (℥i.—℥ii. ad. ℥i.).
Extract of belladonna (℥i.—℥i.).
Cyanide of potassium (gr. iii.—℥i.).

All these may be made with lanolin. A lanolated ointment is more readily and completely absorbed by the skin. As a rule, it is sufficient to add one part of fresh lard to two of lanolin, with a little rosewater as a basis for the ointment.

Lupus.—Certain chronic, painless, hypertrophic states of the vulva, without infection of the neighbouring glands, yet liable to various degrees of ulceration, have been described by Duncan, Huguier, and others as lupus. Thin, from his pathological examination of some growths submitted to him by Duncan, supports this view, pointing out, however, that the microscopic appearances are quite different from those found in lupus vulgaris. There was small cell infiltration beneath the epithelium, and bloodvessels ran straight to this part. Fibrous tissue was found in all stages of development.

To this same condition of the vulva the ambiguous term *esthiomene* (ἐσθίω, 'to eat') has been given by Huguier. This term has been loosely used for a variety of serpiginous and ulcerative conditions. It has been applied, for instance, to a recurring malignant ulceration on the lower extremities, and to what was known as the 'menstrual ulcer' occurring in women. Its original application to the rare condition *lupus exedens* of the genitals in all probability accounts for its recent adoption in these asserted lupoid conditions of the vulva. Hutchinson and Malcolm Morris doubt the accuracy of Duncan's view, and rather regard these cases as having a syphilitic origin. I have met one such typical case as those described by Duncan. I clearly traced a syphilitic history. Shaving away the growth, I used Paquelin's thermo-cautery, and the part healed. This appears to be the best treatment, attended, if there be evidence of syphilitic taint, by specific constitutional measures.

Oozing Papillomatous Tumour.—I have seen one case of this rather rare affection, presenting exactly the clinical features described by Emmet under this name. The woman, about thirty, was unmarried. There sprouted from one labium, extending round the fourchette to the other, a large red-raspberry-looking mass, bleeding rather profusely on examina-

tion, painless, and secreting an offensive discharge. It was a most characteristic growth, and had grown to a large size before the patient came into the hospital. An effort was made with ligature and cautery to remove it, but the hæmorrhage was so great it was not possible to proceed to this end. I do not know what the sequel of the case was. Emmet's reported case recovered, though here also there was alarming bleeding.

Rodent Ulcer.—This very rare form of malignant disease does not differ, save in so far as it is influenced by the anatomical site in which it occurs, from the same disease elsewhere, and may be considered an epithelioma. The treatment is conducted on the same principles which determine us in the management of rodent ulceration occurring in other situations. If by the hard base and slow progress, tubercular appearance, and absence of pain, we should be able to recognise the disease early and before ulceration has extended widely or deeply, we may prevent the spread of the growth by the knife and caustics, the most powerful of the latter being potassa fusa, chloride of zinc, and nitric acid. We must be careful to distinguish it from syphilitic ulceration, and from what few are likely to see in a lifetime—so-called 'lupus of the vulva.'

Cancer of the labium is not a common disease. The form in which it is most frequently met with is that of cancroid. Epitheliomatous nodules may exist for some time, and give rise to little pain. It is not until ulceration commences that much uneasiness is felt. The inguinal glands become involved. It is difficult, save by careful microscopical examination, to distinguish such nodules from syphilitic neoplasms, or so-called lupus.

Treatment.—If superficial, it is better to remove the mass with the knife and use the actual cautery to the raw surface. Hæmorrhage is always to be dreaded. Should it occur, powerful styptics or the actual cautery, and a firm compress applied with a bandage, will be necessary. But despite all our efforts, in advanced cases, fatal bleeding may result.*

* See p. 753 for *Elephantiasis.*

Syphilis.—Care has to be taken in the searching for, and the recognition of, primary syphilitic sores. They frequently are seen on the opposing surfaces of mucous membrane. They are either true chancres, chancroid sores, or they may assume the sloughing or phagedenic type. Chancres may also be found on the perinæum and anus.

Secondary syphilitic eruptions are frequently met with about the labia and perinæum, extending to the anus and gluteal folds.

Evidences of Syphilitic Infection.

It may be well here to append a table of the principal signs on which we rely as collateral evidence of constitutional syphilis:

Granular enlargements in the groins.
Symmetrical skin affections, as maculæ, papules, or roseola.
Symmetrical throat eruptions and ulcers.
Condylomata, syphilitic vegetations, and warts on the labia.
Palmar syphiloderm.
Syphilitic changes in the nails.
Falling out of the hair.
Nodes.
Ozæna.
General discoloration of the skin.
White cicatrices and scars on the body.
Iritis and retinitis.
Stricture of the rectum.
Gummata, sores, fissures, and ulcers of the tongue.
Frequent abortions and miscarriages.
Nasal and naso-pharyngeal discharges attended with ulceration of the mucous membrane or perforation of the septum nasi.

In the treatment of primary sores, the vulva should be frequently dressed with calomel lotion, and washed with carbolized or Condy's lotion occasionally. At night an iodol or iodoform ointment may be used, or whatever muslin dressing is selected. The best method of administering mercury is by inunction or hypodermic injection. The mercury may be given up to the point of its therapeutical manifestation, which is watched through its effect on the gums, and its use must always be carefully supervised.

In many cases of secondary and tertiary affection I give the tannate of mercury in gr. ss.—gr. i. doses, either alone or combined with quinine, or with quinine and arsenic, with excellent results.

In secondary syphilitic neoplasms and exanthems in women, I know of no safer or better preparation of mercury than the bicyanide in combination with quinine in pill, as already advised (gr. $\frac{1}{12}$, carefully divided, three times in the day).

℞ Acid. arseniosi, gr. $\frac{1}{36}$.
Hyd. bicyanidi, gr. $\frac{1}{12}$.
Quinæ sulph., gr. i.
Ext. gent., q.s.
Misce panis. Ft. pil.

During its administration, the iodides of sodium and potassium may be taken in full doses.

Iodoform (in gr. i.—gr. ii. doses, in pill, three times daily), when it can be borne, acts more quickly. The mixture of the iodides of sodium, potassium, and ammonium in combination with bark is an admirable one. Iodide of potassium should always be given freely diluted with water, to avoid iodism. Women suffering from specific affections require plenty of light nourishing food, change of air, and a continuance of anti-syphilitic remedies for some time. Mercury, whether by vapour or inunction, should be administered with great care, and it is a good plan to omit its administration from time to time, never pushing its therapeutical effects to the limit of salivation. As local applications to syphilitic sores, to clean their surfaces, and to encourage healing, iodoform, iodol, and iodide of starch (in the form of ointments) are excellent preparations. For sores about the anus, black oxide of mercury lotion, bismuth and calomel ointment, and calomel fumigation are most useful. So is light touching with a pencil of sulphate of copper.

Especially during the tertiary stages (the 'exanthem period' of syphilis) to enforce a sojourn at Aix-la-Chapelle for at least from five to six weeks is the best treatment. This consists mainly in a graduated course of mercurial inunction under skilled rubbers, with baths, or, in severe cases, mercurial sub-cutaneous injections. The diet, bathing, exercise, and friction are all carefully regulated. I have never seen a syphilitic case which was not greatly benefited by a sufficiently long course at Aachen.

Simple Vulvitis.—This affection is the result frequently of want of cleanliness, deficient food and exposure, violent coitus, pruritus and the consequent rubbing to allay the itching. In children it is produced from the same causes, and is occasionally

due to the irritation of threadworms. In simple vulvitis there are swelling, heat, irritation, and a leucorrhœal vulvar discharge of mucus, epithelium, and pus.

Purulent Vulvitis.—This is a much more serious form of inflammation. The preliminary symptoms are all intensified, and are followed by a copious discharge of pus. If the labia be separated, the mucous membrane will be found in parts excoriated or ulcerated, and in some instances patches of diphtheritic membrane are seen on the mucous surface.

Causation.—It is brought on by *want of cleanliness*, *traumatic causes*, *gonorrhœa*, *excessive venery*, and is associated with *vaginitis and vaginismus*, *pruritus*, *vulvar eruptions* (*as eczema*), *fissure of the vulva*, *the exanthemata.*

Symptoms.—Besides the ordinary symptoms of vulvitis there are frequently most severe pruritus, constant micturition and scalding, with an inflamed meatus urinarius. The discharge has an unpleasant odour. Cystitis may arise. The treatment must be conducted on the lines laid down for the cure of vaginitis, both simple and specific. This includes rest; fomentations; baths; warm opium and acetate of lead lotions; poultices; mild astringent and sedative applications when the acute stage has passed; an emollient ointment used to separate the nymphæ. Later on, any raw surface is painted with a mild nitrate of silver solution, and an antiseptic and stimulating lotion of carbolic acid, boracic acid, sulpho-carbolate of zinc, thymol, etc.

Follicular Inflammation.—In this variety of vulvitis the various glands—muciparous, sebaceous, and other—of the mucous membrane of the vulva are swollen and inflamed. This follicular distension often leads to furunculus. The minute boils recur. At times this recurrence of the furunculous abscess is most distressing to the patient. No sooner is one evacuated than another appears. The boils vary in size. Not so long since I was consulted by a patient who had had a constant recurrence of such furunculi for a period of six months. The swelling may involve the entire labium of one

side. The uterine-cervical follicles may also be found swollen and suppurating.

Causes.—It is sometimes associated with the leucorrhœa of pregnancy; otherwise the causes operating in producing follicular vulvitis are much the same as those which induce simple vulvitis. (See Vaginitis.)

Symptoms and Signs.—The same itching and sense of burning heat, with extreme sensitiveness of the vulva, that are present in other forms of vulvitis, mark the presence of the follicular varieties. Both the muciparous follicles and the sebaceous glands can be detected enlarged; the former in patches, the latter as congested papillæ. There is considerable pain attending the formation of each fresh tiny boil. If they assume a large size, the suffering is great in this sensitive part. The patient also falls off in her general health; she cannot take exercise, and the appetite is affected. A most important feature of this inflammation must be remembered by the practitioner, viz., that it is liable to cause urethritis in the male, and thereby give rise to a suspicion of unchastity in the mind of a husband.

Treatment.—It is well to remember the recurrent nature of folliculitis. This is due to auto-inoculation and the dissemination of the micrococcus after the bursting or evacuation of the suppurated follicle. The urine should be examined for any sources of irritation; it will be found at times glycosuric, and in the vulva, as elsewhere, this saccharine state of the blood tends to promote fermentative action and the development of microbal life. The uterus should be attended to, and any cervical or vaginal discharges cured. The perchloride of mercury lotion (1 in 5,000) may be used as a vaginal lotion. The vaginal douche should be used a few times in the day, and some alkaline powder, such as borate or carbonate of sodium, added to it. A lotion of eau de Cologne in rose-water (℥i. in ℥viii.), with dilute hydrocyanic acid, will be found very soothing if there be heat and irritation of the vulva. The part is first well sponged with warm water containing one drachm

to the gallon of liquor carbonis detergens ; next it is thoroughly dried, and the eau de Cologne wash is then applied. Any suppurating follicles should be laid open with a knife. If a vulvar abscess forms it is freely incised.

Phlegmonous Inflammation of the Labia.—When from any cause we find that one labium has become enlarged, tense, hard, painful, and very tender, we may suspect phlegmonous inflammation. The effusion is generally followed by the formation of pus and an abscess. After opening a large vulvar abscess the practitioner should carefully see that it heals well

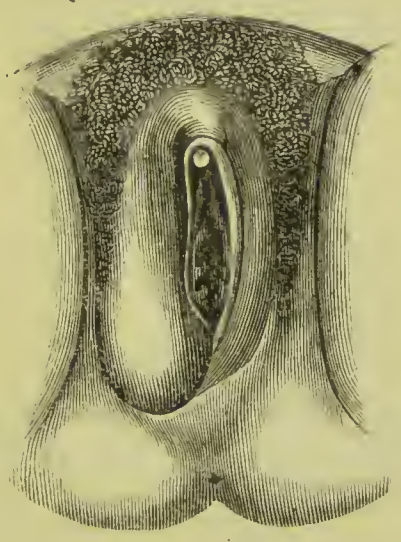


FIG. 493.—Abscess of the Bartholinian Gland (Huguier).

from the bottom of the wound. Nor should the patient be allowed from under observation until it has so healed. Otherwise a sinus is apt to remain, which will require subsequent free slitting open with the knife, and seriously protract the recovery of the case. We must treat it on the general principles of relieving pain, promoting the formation and the free evacuation of pus. Care must be exercised not to mistake phlegmonous inflammation for a hernia, hydrocele, or pudendal hæmatocele. That an ovary may be displaced into the vulva, we have seen. We must not commit the pardonable error of mistaking such an inflamed ovary for phlegmon. The presence

of a circumscribed tumour in either labium, which becomes periodically sensitive and very painful—this increase of sensitiveness corresponding with the menstrual periods—should be sufficient to remind us that an ovary may find its way into the labium.

Abscess of the Vulvo-Vaginal Glands.—This affection of the vulva and its treatment has already been incidentally alluded to (p. 3). The position of the tense, hard, painful swelling, frequently attended by a certain degree of vulvitis, and its

FIG. 494.—Vegetation of the Vulva (Tarnier).

sudden advent, should be sufficient indication of the nature of the inflammation.

Gangrene—Noma.—This serious affection is not, fortunately, of frequent occurrence. Yet I have seen one instance in which death occurred, not so much from the ravages made by the local gangrene as the cachectic weakened state of the child. I have never seen it in an adult. The predisposing causes are such as we find producing low and unhealthy types of inflammation elsewhere in the body, notably cancrum oris, and those sloughing ecthymatous sores frequently seen in impoverished and dirty children. If not checked, the course of disease is that of unhealthy ulceration when attended by mortification

generally. The *treatment* consists in generous support of the child, and the application of such disinfectants as carbolic acid, chloride of zinc, iodoform, Condy's fluid. Poultices had better be avoided. If any should be used, those of charcoal, and yeast with nitric acid, are perhaps the best. The usual means adopted to prevent the spread of mortification must be had resort to in this case, as the application of nitric acid, pure carbolic acid, and the actual cautery.

Warts and Vegetations.—These growths occur in different situations around the vulvar orifice. They are frequently the result of gonorrhœa or syphilis. This, however, is by no means the rule. I have seen in a virgin, suffering from leucorrhœal discharge, two pretty large vegetations growing from the neighbourhood of the clitoris.* The growths are removed by the scissors and galvano-cautery. If the wart be of large size, a ligature is applied to its base or pedicle a few days before removal. We thus avoid the chance of hæmorrhage, which otherwise may be inconvenient. Such warts should never be cut off carelessly without means at hand to restrain the bleeding which may follow. I have destroyed these vegetations without any cutting operation, by means of the repeated and careful application of acid nitrate of mercury, chromic acid, or glacial acetic acid, and in aggravated cases it may be neces-

* *Herpes Vegetans of the Vulva.*—Bataille exhibited a case at the 'Société de Dermatologie et de Syphiligraphie' in which there was no history of acquired or hereditary syphilis. Following a foul discharge from the vagina and general symptoms of pyrexia, there was an eruption of *herpetic vesicles*, which spread from the groin to the vulva, and to the anal fold. The swollen vulva was covered with vascular erosions, which had in parts a diphtheroid appearance, so much so as to give to the erosion a chancriform look. One of these erosions was at the orifice of the urethra. The cervix uteri was swollen and red, the lips were everted, and there was a muco-purulent secretion from the uterus, vesicles were seen on the tonsils, and the sub-mental ganglia were enlarged. After successive formations of vesicles had occurred, the ulcerations in healing developed hypertrophic vegetations in masses of violaceous red colour, with bleeding surfaces, resembling syphilitic ulcers, most difficult to diagnose from the latter (Fournier). The possible occurrence of such suspicious vegetations on the vulva, without any syphilitic history to connect them with specific infection, is worth remembering.—*Annals de Dermatologie et de Syphiligraphie*, Paris, p. 289; *Annual of Universal Medical Science*, 1893.

sary to apply Paquelin's cautery after the removal of the growth with a cutting instrument.

Trachoma Pudendorum.—Tarnovsky has described a true trachoma of the labia. The disease consists in the aggregation of nodules of a grayish or yellowish colour. These may coalesce and form an oval patch, the epithelium covering of which thickens and becomes rough. The nodules contain micrococci and epithelial cells. This condition is more likely to be found in those who have been exposed to gonorrhœal infection. It causes, especially with warmth, itchiness of the vulva, and a sense of heat.

The *treatment* consists in superficial scarification of the trachomatous patch, and the use of such lotions as those of perchloride of mercury (1 in 2,000), nitrate of silver (5—10 gr. to ℥i.), or chromic acid (10 gr. to ℥i.).

Cysts of the labia are comparatively rare (cyst of the vulvo-vaginal gland has been referred to, p. 3). They must be treated on the same plan as that recommended for the destruction of vaginal cysts.

Varix of the pudendal veins is generally the result of pregnancy. The danger is rupture of a vessel and serious hæmorrhage. A suitable air-pad support will be found useful in these cases. If hæmorrhage should occur, the usual means must be taken to control it (see 'Pudendal Hæmorrhage').

Pudendal Hæmatoma (wrongly called thrombus).—Blood may pour in quantity from the labia in consequence of puncture or laceration of the veins of the vestibule. Or it may accumulate in the cellular tissue of the labium. This accident is one which may occur during parturition. Independently of pregnancy, it may follow from traumatic causes or violent muscular efforts. The sudden appearance of a swelling in either labium, following the injury or strain, and the sense of throbbing and pain which generally succeeds, are in themselves sufficient to indicate what the nature of the accident is. However, cases occur in which the attention is first attracted by the presence of a tumour, and the obstruction it causes to micturition or coitus.

Treatment.—If the vulva be bleeding from a wound, a tampon must be placed in the vagina, and a firm compress with a T-bandage secured externally. This may be made to include a small ice-bag. A saturated solution of alum may be kept to the bleeding part. An acupressure pin or a silver suture can be passed from the cutaneous to the mucous surface, so as to compress the bleeding vessels (Goodell). If a hæmatoma should form after the removal of a cyst from the vulva from secondary hæmorrhage, the sutures should be at once removed, the clots turned out, and the bleeding points secured by forcipressure or gut ligature. When blood is effused into the cellular tissue, and a tumour forms in the labium, it may be (1) absorbed, or (2) remain in a liquid state, or (3) suppuration may occur. Rest, pressure, and cold will generally favour absorption. Should this not happen, and inflammation and suppuration follow, the pus must be evacuated, and any coagula removed by an incision made from the mucous surface with every antiseptic precaution.

Elephantiasis.

This disease rarely occurs in Europe. The growth is a chronic hyperplasia of the skin and cellular tissue, consequent upon an inflammable œdema, which is characteristic. Ultimately a neoplastic growth forms, which is developed into fibrous tissue. The surface of the skin finally becomes thick and scaly, from changes in its papillary and epidermic layers. Pye Smith describes a section of the affected skin as made up of massive fibrous bands of white and elastic tissue, with œdematous, connective, and adipose tissue, while the lymph spaces are enlarged and the lymphatics are dilated and varicose, consequent upon the absorption of the lymphatics.

These changes are frequently associated with the presence of the parasite *Filaria sanguinis* (*Filaria Bancrofti*). *Vide* Fagge and Pye Smith's 'Medicine,' 'Chyluria,' vol. ii.; Manson, Pathological Transactions, 1882, on the Filaria sanguinis.'

Labourand has drawn attention to the attacks of lymphangitis and fever which periodically occur during the invasion into the connective tissue and lymph spaces of microbes (strepto-coccus of Fehleisen), associating it with the lymphangitis of syphilis. This indicates the importance of asepsis in the treatment of the disease (*lib. cit.*).

Appearance, Symptoms, and Diagnosis.—The characteristic swelling and thickness of the skin over the perinæum and vulva, with the large tumours that subsequently are formed, afford sufficient evidence of the nature of the disease. The friction of the opposite lips may lead to ulceration, and occasionally vegetations are found, due to papillary hypertrophy.

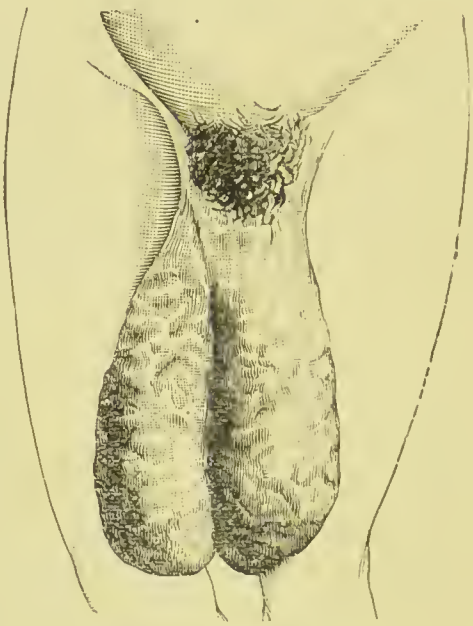


FIG. 495.—Elephantiasis of the Vulva (Pozzi).

The tumid parts may be attacked with erysipelas, when there will be the usual symptoms of this affection.

Treatment.—The sole treatment is ablation, in which special attention has to be paid to the control of hæmorrhage. If it be possible to apply it in the case of the female, the elastic ligature and clamp should be availed of. The galvano-cautery loop may also be used. Every care must be taken to prevent sepsis or suppuration. And it must be remembered that the

earlier this operation is performed, when it is clear that the disease is progressing, the better, unless it be contra-indicated by such conditions as albuminuria, anæmia, dysentery, or tumours of the uterine tissue.

Tumours, sarcomatous, fibromatous, and lipomatous, are found growing from the labium, nymphæ, hymen, and clitoris. Perhaps the most commonly met with are the lipomata. They are readily removed with knife, scissors, or écraseur.

Hernia of either the ovary or intestine may occur into the labium.* Its descent by the unobliterated canal of Nuck is analogous to the corresponding descent of the intestine in inguinal hernia in the male. The bowel can generally be reduced in the recumbent posture by taxis, but it may become strangulated. The possibility of this accident must be remembered by the surgeon before he takes up a lancet to open an assumed abscess or cyst of the labium (see chapter on Diseases of the Ovaries). Koppe has described cysts of the round ligament as liable to be mistaken for hernia. These cysts may be due either to effusion of blood in unobliterated canals in the ligament, or to distension of the vaginal process of the peritoneum, the inguinal portion being obliterated. Such cysts are apt to be mistaken for cystic distension of the vulvo-vaginal gland.

Hydrocele, or an accumulation of fluid in the canal of Nuck, is of such rare occurrence that we need not here consider its pathology in detail. It may be sacculated if the abdominal opening of the canal be closed; otherwise this fluid can be pressed out of its sac. It is well, however, to remember the possibility of such a condition existing, and not to commit the error of mistaking it for hernia, tumour, or abscess.

Tumours.—Enormous pendulous tumours have been recorded as growing from the vulva, such as encapsulated fibromyoma (Réverdin), molluscum pendulum, a pedunculated polypus (Moclaire). Of the latter, an example reached as far as the inner condyle of the femur, thirteen inches in length.

* See 'Salpingocele,' p. 585.

In its point of greatest diameter it reached twenty-five inches. Large pediculated myxomatous tumours have been recorded (Kortright).

Epithelioma and Chancroid.

An admirable differential table of epithelioma and chancroid of the vulva has been drawn up by Davis of Atlanta, who lays down the following distinctions:

EPITHELIOMA.	CHANCROID.
Age.—Usually occurs later in life, after 35 years. There are recorded cases occurring at 18 years of age. These are rare.	Occurs usually early, but may be observed in the old.
Heredity.—Usually history of malignant disease of ancestors.	Plays no part.
Location.—When confined to cervix, most frequently found at the site of a previous laceration.	On lower fourth of vagina, and sometimes on cervix.
Frequency.—Not of rare occurrence. Married women and those having borne children suffer oftenest.	Rare. Prostitutes or married women who become infected by their husbands are affected.
Development.—Usually slow at first. Begins as a hard elevation or nodule.	Rapid. Begins as a pustule, rapidly becoming an ulcer.
Number.—At first a simple ulcer, until the glandular tissue breaks down, forming another.	May be single at first, but rapidly becomes multiple.
Auto-inoculation.—Questionable.	Auto-inoculable, producing characteristic chancroid.
Colour.—Dirty, with livid edges covered over with broken-down tissue. Discharges a fœtid ichorous fluid, very irritating.	Yellow, tawny, and discharging a yellow pus.
Hydrorrhœa.—Hæmorrhage. No tendency to cicatrization. Extends in direction of vagina and body of uterus.	No hydrorrhœa; little hæmorrhage. Evidences of cicatrization on vaginal and cervical surface.
Buboes.—Late. Multiple enlargement of glands.	Occur early and suppurate, as a rule. Usually single.
Microscope.—Shows presence of epithelial scales in so-called nests.	Absence of these.
Cachexia.—Marked—late in disease.	Usually absent.

CHAPTER XL.

COCCYGODYNIA.

By coccygodynia we understand a painful affection of the coccyx and perinæal structures, which principally shows itself in painful sitting, and pain in the act of defæcation. The structures involved are: the coccyx, the sacro-coccygeal ligaments, and the perinæal muscles attached to the coccyx.

Causation.

Traumatic { Blows, kicks, or falls on the coccyx. / Difficult parturition. / Instrumental delivery.
Horse-exercise (Scanzoni, Goodell).
Constant sitting.
Hysterical temperament.
Rheumatism.
Uterine and ovarian disease.
Rectal disease.

I have, however, seen severe coccygodynia present in an unmarried woman in whom not one of the causes enumerated above could be traced.

I had attended her some time previously for a severe attack of erysipelas of the face. From this she perfectly recovered. There was no rectal, uterine, or other local trouble. She was not, in the least, of an hysterical or nervous temperament. She had no sedentary occupation, nor was she in the habit of taking horse-exercise. At first her sister consulted me, telling me that the patient thought she suffered from internal piles, and was averse to seeking advice, but that the difficulty in sitting had become so great she could not come to meals. The pain had come on gradually. The discomfort produced

by examination of the rectum or any pressure on the coccyx was inconsiderable, and yet she could not sit without great suffering. In this case relief was afforded by sitz-baths, counter-irritation over the coccyx, anodyne liniments, and suppositories, a rectal plug, which was worn at night, and the internal administration of bromide of potassium with nux vomica.

In a few cases under my care, coccygodynia has been the most troublesome symptom complained of prior to mental disturbance showing itself. In one instance there was an attempt at suicide, the patient attempting to drown herself.

As bearing on the obstinate nature of this affection and its persistence under all treatment, I may instance a case I saw with Dr. Gostling, of Worthing. The lady fell and fractured the coccyx. This caused the coccygodynia, which was of a most aggravated and agonizing nature. After trying various remedies without avail, Dr. Gostling, by my advice, removed the coccyx. Still the pain continued, for which morphia had to be given. The least touch of the finger on the part caused a shrinking and pain. Subcutaneously the structures for a short distance from the end of the sacrum were divided, and still the pain and inability to sit remained. Finally it was decided to apply the actual cautery over the origin of the sacral nerves. This was done by Dr. Gostling, with the result that the patient completely recovered.

On examination by the rectum and vagina, the coccyx, if dislocated or fractured, is felt quite movable or loose.

Treatment.—Such nerve tonics as arsenic, strychnine, sulphate of zinc, pyrophosphate of iron, and other salts of iron, if there be anæmia, should be tried. The valerianate of zinc and the ammoniated valerian in combination with the bromide salts are useful. The painful region may be sprayed with ether night and morning. The application of the actual cautery, as in the above case, often benefits. Change of air and scene, suitable exercise, and other general hygienic measures, should accompany any treatment. If palliative treatment should not cure the patient, the subcutaneous division of the coccygeal ligamentous and muscular attachments may be proposed (Sir J. Simpson), or extirpation of the bone itself can be carried out (Nott). In deciding on any radical step, such as subcutaneous section or removal, we are influenced chiefly by the decision as to the traumatic character of the affection. It is in those cases of partial dislocation or other injury of the bone that extirpation is especially indicated.

The important practical rule to adopt in any case in which we are consulted for 'painful sitting' or symptoms of coccygodynia is *to carefully exclude any uterine, vaginal, perinæal, or anal affection* which might account for the pain, and the removal of which will often relieve all the distressing symptoms.

Operation.—This is an operation which should be done aseptically. An incision is carried over the bone in the middle line. With a blunt-pointed knife the bone is severed from all its attachments. The edge of the knife is kept close to the bone. Then the bone is disarticulated and ablated. The wound is brought together with gut sutures, and covered with boric lint under strapping and a T-bandage. It is as well to keep the rectum quiet for a few days.

CHAPTER XLI.

URETHRAL AFFECTIONS.

The examination and exploration of the urethra have been already referred to. In the ensuing chapter Howard Kelly's method of exploration is described. Dilatation, with the use of the finger, is the most certain means of examining the urethra. Many forms of urethral specula have been devised. Perhaps those of Reeves (Fig. 497) are among the best. They are made of diverging blades of silver, and reflect the light well. They are of different sizes, and by rotating the blades the mucous membrane can be seen.

The principal urethral affections are :

Congenital abnormalities.*	Condyloma.
Urethritis.	Vegetations.
Prolapse of the urethra.	Vascular caruncle.
Urethrocele.	Tumours.
Urethro-vaginal abscess.	Cancer.
Fistulæ.	Polypi.
Stricture.	Calculus, and foreign bodies in.
Angioma.	

* A case was sent me by the late Martin Brown, of Exeter. A young woman, aged 21, had never retained her urine. The urethra (practically the neck of the bladder) was very large, admitting the forefinger, and was about one inch in length. The ureters opened immediately into it. The bladder was contracted to the size of a few inches in either diameter. Its mucous coat was quite smooth. The large urethral orifice was placed high up at the summit of the vulva, which was abnormal in the position of both its larger and smaller lips. The vaginal canal otherwise was normal. The girl, who was very good-look-

Congenital Abnormalities.—The external meatus may be displaced to the side, a ridge of mucous membrane projecting in the middle line. The urethra itself may be absent in whole or part. The vagina and bladder, in a case of Langenbeck's, formed a common canal. Atresia of the urethra is very rare, but it has been noticed. In hypospadias portion of the urethra is absent, and the urethra opens within the vagina, and there may be a common urinary and vaginal orifice. As we have already seen, the position and direction of the urethra are attended by various complications, such as elongated cervix uteri, prolapse, tumours of the uterus, and cystocele.

Urethritis is generally the result of specific inflammation, though it may accompany other inflammatory states, both of the bladder and vulva. For the general treatment, the reader can refer to the chapter on Vaginitis. If the urethra should remain inflamed and vascular, one astringent application may have to be made to the mucous membrane, such as nitrate of silver.

It may be well, in connection with the subject of urethritis, to emphasize the caution to be observed, in catheterization of the female bladder, in regard to the cleanliness of the catheter. Several cases of cystic inflammation have come under my notice in which the trouble could be clearly traced to the carelessness of a nurse in using a soiled or infective instrument.

ing, had an offer of marriage. An endeavour was made to create a urethral orifice by transplanting the labia and nymphæ towards the mesian line, and thus to elongate the urethral canal. There was a partial success. But it was not permanent, though the cosmetic effect was all that could be desired. The urine secreted from the kidney immediately crusted on the self-retained catheter, and commonly dried in powder on the clothes. I had some collected and analyzed. It was resolved into calcium phosphate, sodio-ammonium phosphate, and ammonio-magnesium phosphate—practically, earthy and alkaline phosphates. It was surcharged with ammonium carbonate, probably produced by the decomposition of urea. It also contained an amylotic ferment and traces of pepton, phenol, and biliary excreta. A portion of an elastic catheter macerated in some of this urine for three days was etched and bleached, a white deposit (phosphatic) of earthy salts being deposited upon the submerged surfaces. At the same time a small quantity of sulphur was dissolved by the fluid.

Nurses should only use glass catheters, and they should always be provided with two of these. This will ensure cleanliness.

Prolapse of the Urethra is very rarely met with. Care must be taken not to mistake the red and everted mucous membrane for a urethral growth. The prolapsed portion must be removed either by knife, scissors, ligature, or galvanic wire. Hæmorrhage has to be controlled by a tampon and T-bandage. Emmet's plan of treating prolapse of the urethra is to make an opening in its posterior wall similar to that described in the button-hole operation. The prolapsed tissues are drawn through the slit from before backwards. A sound is carried into the urethra to place it on the stretch. Sutures are then introduced 'entirely through the flaps in the urethra, so as to transfix the lining membrane along the edges of the wound; the excess of tissue is then removed, and the opening closed.'

Urethrocele.—There is a difference between simple prolapse of the urethra and true urethrocele (Emmet), in which latter affection there is both shortening and sacculation. This sacculation, Bozeman explains, is due to contraction at or near the meatus, and its consequent dilatation and bagging above the constriction, and the retention of urine in the urethra. Emmet, on the other hand, associates urethrocele with injury to the urethra, occurring either in too rapid or too tedious a labour. The head in its advance pushes the loose mucous and submucous tissues of the upper part of the urethra into that portion below the pubic arch, and thus dilates it. Cicatrization of either end of the urethra may occur with resulting sacculation of the intervening portion of the canal. Such conditions of prolapse or true sacculation require careful examination on the part of the surgeon, so that he may not confound the swelling with a tumour or vesical enlargement, or look on it as a mere secondary consequence of either a rectal or uterine affection. In urethrocele, Emmet introduces a block-tin sound into the urethra. With this the prolapsed tissue of the vesical end of the urethra is pushed back into the bladder. The centre of

the urethrocele is steadied with a tenaculum while the sound is cut down on with bent scissors. A fairly free incision is made, avoiding the neck of the bladder or the meatus urethræ. The excess of tissue entering into the urethrocele is now cut away, but sufficient is left to cover the sound. The sac is thus obliterated. The urethra is drawn out with tenacula to its complete length, and with fine interrupted silk sutures the vaginal and urethral mucous membranes are brought together. The urethro-vaginal fistula thus made is not closed until the urethra is restored to nearly a normal condition.

Abscess in the Urethro-Vaginal Septum.

T. S. Cullin has accurately described the ætiology, symptoms and pathology of this affection.*

Ætiology.—After reviewing the anatomy of Gartner's ducts in the urethro-vaginal septum, he refers to the researches of Rieder, Dohrn, and others, proving that there are remains of the ducts in the vaginal septum, so also that Skene's tubules, which are situated just within the urethral orifice on either side, may be the remains of Gartner's duct (Kock and Böhm). The possible causes of the saccular abscess found in the saccular distension of the urethro-vaginal septum are:

1. Congenital cysts or those occurring in the new-born. The latter variety has been mentioned by Englisch, who found that in new-born children small oblong cysts are occasionally present in the urethra near its orifice. He suggests that these may in after-life increase in size, and give rise to the above condition.

2. A true urethral diverticulum where all the urethral coats take part. This is due to the wall becoming weak at one point (Lannelongue, Priestley).

3. Accumulation of secretions in a urethral gland.

4. Dilatation of a lacuna of Morgagni probably due to inflammation, closure of its orifice, and subsequent distension with secretion (Winckel).

John Hopkins Hospital Bulletin, 1894.

5. Dilatation and possible occlusion of Skene's tubules (Böhm).

6. Arrest of calculi in the urethra, with a diverticulum forming to accommodate the same (Chéron, Piedpremier).

7. Traumatism, as a kick, or injuries during labour. Here an abrasion of the mucous membrane takes place, and the urine gains access to the small pocket, decomposes, and sets up an inflammatory process (Duplay).

8. A suppurating cyst situated in the urethro-vaginal septum, and afterwards bursting into the urethra (Hermann).

Symptomatology.—It may be found in persons of any age (Chéron)—more likely between thirty and fifty. The symptoms are painful micturition, with discharge of ammoniacal urine or pus.

About this time a swelling is noticed in the vaginal vault. It is usually situated in the mid-line about 1 to 2 cm. behind the external orifice of the urethra. The tumour varies in size from a marble (Routh) to a hen's egg (Tait), is tender and fluctuant. On pressure it diminishes in size, and discharge of ammoniacal urine or pus from the urethra follows. A catheter introduced along the anterior wall of the urethra will enter the bladder without difficulty, and usually clear urine escapes. If introduced along the urethral floor with its point directed downward, it will enter the sac cavity. The patients are usually in good health and give no history of chills.

On changing from a sitting to a standing posture there will often be an escape of the sac contents, the first intimation to the patient being that the clothing is moist. Coition may also cause a discharge of the fluid (Giraud). In one case, on pressure the contents escaped into the bladder instead of passing out of the urethra (Santesson). Where the discharge is irritating there is excoriation of the external genitals and thighs. The sac opening in the urethra will admit as a rule a No. 6 catheter. The sac may have smooth glistening walls (Hey), be lined by squamous epithelium (De Bary), or have a ragged appearance with trabeculæ traversing its cavity (Routh). Its

contents are usually decomposed urine and pus cells, and where the sac contains calculi, blood cells are also found (Chéron and Giraud). In one of the cases where calculi were present the interior of the sac presented an ulcer at its most dependent part, which was probably due to mechanical injury produced by the calculus.

Treatment.—This consists in the removal of the redundant tissue *in toto* by an elliptical incision, then a slight inversion of the mucous membrane, and closure by silk sutures. The catheter should be passed three times daily for three to four days, and the patient should afterwards be advised to urinate in the genu-pectoral position for a week longer. In introducing the catheter, care should be taken to pass it along the anterior urethral wall.

Stricture.

Stricture of the urethra may follow :

Traumatism in labour.
Cauterization.
Gonorrhœa.
Vulvar lupus.
Congenital origin.

Hermann has reported a case of lupus limited to the urethra, but this affection is very rare.

Stricture must be treated either by rapid and forcible dilatation or by gradual dilatation. If the former be practised, care must be taken not to injure the neck of the bladder so as to cause incontinence.

No permanent trouble has ever arisen in any case of urethral dilatation in my practice. Emmet has recorded two cases of incontinence in eleven cases of dilatation ; Noeggerath two cases of incontinence out of seventy-five.

I prefer my metal uterine dilators for this purpose to any other. They are safer than Hégar's, and the graduated double bulb ends are easier of introduction. For incontinence of urine with pain, whether it is caused by urethral growths, extraneous pressure, or vesical irritation, the greatest relief will be found frequently to follow simple dilatation of the urethra.

This can readily be effected in the manner already described. The practitioner will do well to use gradual dilatation, and exercise all possible caution to avoid laceration of the neck of the bladder. Emmet insists on the superiority and safety of his method of exploration by incision.

Fistulæ of the urethra must be closed by operation (see Chapter XXXVIII.

Both *venous angioma* and *vegetations* are differentiated from urethral caruncle by their want of sensitiveness.

Polypi are readily removed.

Condyloma.—Pedunculated condylomata, similar to those found elsewhere, grow at the external meatus. They can be snipped off and the cautery applied.

Urethral Caruncle—*Situation and Nature.*—This most painful growth is found at the orifice of the meatus. It consists of a mass of hypertrophied papillæ, freely supplied with bloodvessels and nerves. The papillæ are surrounded by connective tissue, and are covered by squamous epithelium.

Symptoms and Physical Signs.—The patient generally consults us for great pain and frequency in passing water; this at times amounts to excruciating pain. She has to avoid coitus, and if the case be an aggravated one there is pain in walking, and the slightest movement causes distress. The woman's suffering is written on her countenance. She is anxious, depressed, nervous, and hysterical. On making an examination, the cause of the suffering is at once apparent in the little raspberry-red growth or growths which are seen, either sprouting from or occluding the urethral orifice. These may be very small (the largest I have seen have not exceeded in size a small filbert), or they may grow to the size of a pigeon's egg. The characteristic feature of the affection is at once demonstrated by the intense pain on touching the growth, even with a little cotton-wool rolled on a probe. When incompletely anæsthetized the woman will still wince if the tumour be manipulated. Caruncle may occur at all periods of life, both in married and single. Goodell thinks that the pressure on

the urethral veins during the arrest of the head in labour may predispose to the occurrence, but I have seen carunculæ in virgins. Irritating discharges and habits of uncleanliness are predisposing causes.

Prognosis.—The great tendency to recurrence should be remembered. This applies more to the sessile variety than to the pediculated. When multiple, if they be pediculated, there is the best chance of complete cure.

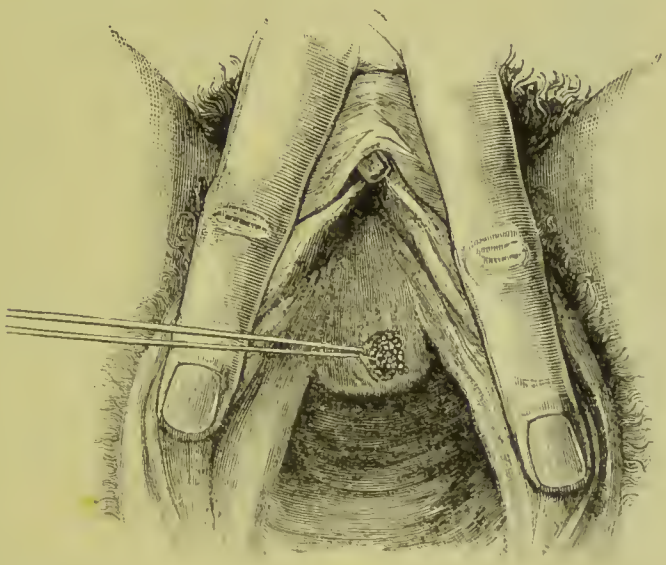


FIG. 496.—Urethral Caruncle.

Treatment.—There is but one satisfactory treatment for urethral caruncle, viz., removal by forceps and scissors, and the subsequent application of the actual (Paquelin's) cautery, or the galvano-cautery knife or wire may be used. We must be prepared for smart bleeding, which may have to be controlled by tampon and compress. If an operation will not be submitted to (which is exceptional), the topical application of such agents as carbolic acid, nitric acid, and chromic acid may be tried in order to deaden sensibility.

Malignant Disease and Tumours.—Cases of *sarcoma*, *epithelioma*, *melanosis*, and *rodent ulcer* are occasionally met with. Temporary arrest or limitation of the disease is the most we

can hope to effect by treatment in these cases. The galvanic knife, Paquelin's cautery, the curette, and such caustics as chloride of zinc, lactic acid, chromic acid, will be found to be the best methods of dealing with these growths.

Physiological Rest to the Bladder.

Button-hole of Emmet.—Emmet devised and advocated an operative procedure for exploration of the urethra, by means of which the entire canal can be explored and any local treatment applied. It is safe, and can be performed without difficulty. It does not interfere with the control of the urine. It affords physiological rest to the bladder in cases of cellulitis, cystitis, and in other cases of persistent bladder irritability. He calls this step 'the button-hole operation.' It is performed thus: The patient is placed on the left side under an anæsthetic, and a Sims' speculum is introduced so as to expose thoroughly the anterior vaginal wall. Emmet himself uses a 'button-hole scissors,' the long blade of which takes the place of a urethral sound and has an aperture through which the vaginal blade passes, the latter being so curved as to avoid the urethral orifice in the incision.

Under any circumstances, it is better to introduce a sound of sufficient size to stretch the urethral tissues. A knife may then be used. The tissues on the vaginal side of the urethra are incised down to the sound, midway between the urethral orifice and the neck of the bladder: this latter must be carefully avoided. The line on the vaginal side is a third more than that on the urethral, this extension being mainly on the vesical side of the incision. Through the incision thus made we can explore the urethra and the entrance to the bladder. Emmet, as I have said, employed this method for exploration, but such an incision for this object solely will be rarely necessary. Should it be so, after exploration, we close the wound immediately by inserting sutures, which include the urethral mucous membrane, and pass from one side of the wound to the other, the lips being well everted by a tenaculum. The patient

is kept in bed for over a week, and the passage of a catheter is avoided if possible.

On the other hand, if our object be to maintain the patency of the opening, so as to secure physiological rest for the bladder, the edges of the urethral mucous membrane are united to the vaginal surface by means of interrupted sutures

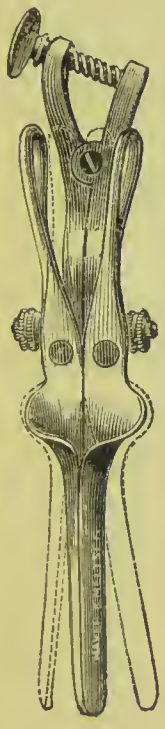


FIG. 497.—Reeves' Urethral Speculum.

FIG. 498.—Button-hole Scissors.

FIG. 499.—Emmet's Button-hole Opening.

of silkworm gut or carbolized silk. The edge of the urethral tissue is drawn out and covered by the vaginal membrane, and both are neatly united, and granulation, if possible, prevented. The patient is kept in bed, the parts are douched with warm carbolized water, and after the douche or sponging, the wound is smeared with some mild astringent ointment or salve; this treatment is continued for some time. If the opening be no longer indicated, it is closed in the same manner as a vesico-vaginal fistula.

CHAPTER XLII.

THE BLADDER.

HYPERÆMIA, CYSTITIS, STONE, TUMOURS AND GROWTHS.

EXAMINATION OF THE BLADDER.—The female bladder may be examined by any of the following methods:

(*a*) *Palpation.*—It may be palpated bi-manually with the index-finger of the left hand in the vagina, and the right hand placed supra-pubically. A tumour or stone in the region of the neck of the viscus may thus be felt.

(*b*) *By the Sound.*—With a sound in the uterus and another in the bladder, the size and situation of a tumour—as, for example, a displaced ovary or dermoid cyst—may be determined on.

(*c*) *Dilatation of Urethra.*—The urethra may be dilated with graduated dilators until the finger can be passed, and the neck of the bladder, as far as the ureteral line, explored. With the finger of the right hand thus in the bladder, and the left in the vagina, circumscribed growths may be felt between the two. This operation has to be conducted under an anæsthetic, cautiously, and the maximum degree of dilatation should be arrived at slowly.

(*d*) *Cystoscopy.*—The electric cystoscope of Nitze may be used. This examination requires care in its application and practice, both on the living and dead subjects and on artificial bladders.

(*e*) *Incision through Vagina and Urethral Dilatation.*—Emmet's plan, by dilatation of the urethra and incision through the vagina, has been already referred to. It is, perhaps, the most preferable method to adopt in certain cases of tumour of the neck of the bladder which have to be removed by operation.

(*f*) *Howard Kelly's Method of Direct Examination of the Female Bladder.*—Howard Kelly's method of direct examination of the female bladder with elevated pelvis, and catheterization of the ureters, is now well known. The importance to the gynæcologist of his exact ureteral examination cannot be over-estimated. I have already, in discussing the surgical treatment of uterine fibromata, referred to the secondary renal effects which follow, both from pelvic inflammations and tumours pressing upon and involving the ureters, as also their implication during the different operations for hysterectomy, and to the anatomy of the ureters and their course. The fact that they are accessible to exploration was demonstrated by Kelly.* For the landmarks for finding the orifice of the ureter and its palpation, the reader should refer to pp. 34 and 35.

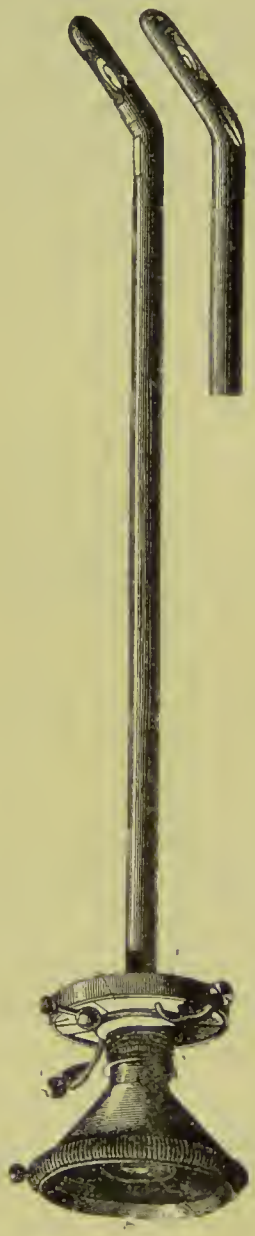


FIG. 500.—Represents the Electric Cystoscope. The size, character, and appearance of morbid growths in the bladder may be readily discerned by its means.

* A full description of Kelly's ingenious plan appeared for the first time in any gynæcological text-book in the sixth edition of this work, taken from the *Annals of Gynæcology and Pædiatry*, May and August, 1893, and *The American Journal of Obstetrics*, vol. xxix., No. 1, 1894.

Uses.

Howard Kelly points out that the relations of the ureteral orifices may alter the normal position and relations of the ureters and their orifices, as in a patient of his who suffered from carcinoma. The value of such catheterization is exhibited in cases of hæmaturia. An interesting case I had in consultation with Dr. F. Parsons, of Wimbledon, in which cystoscopy and digital exploration of the bladder enabled us to decide that hæmorrhage, attended by the discharge of quantities of large pavement cells, was renal, and not vesical, first taught me the value of Howard Kelly's method.

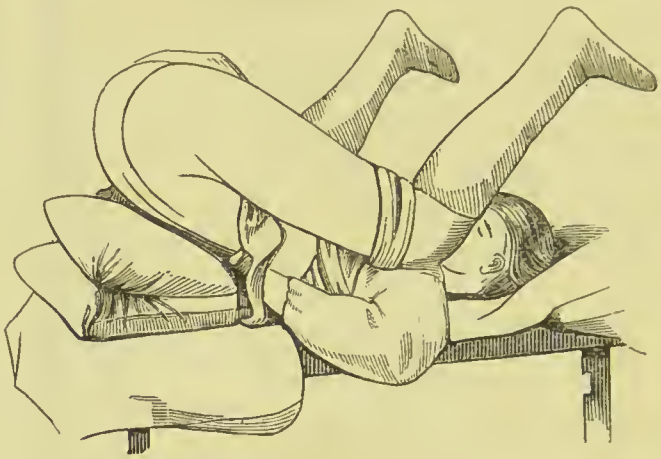


FIG. 501.—Position of the body for Exploration of the Bladder and Ureter in Howard Kelly's method.

History of Cystoscopy by Direct Inspection.—Kelly gives a historical summary of cystoscopy and the practice of dilatation of the urethra, including Simon's method.

This involves (1) incision of the urethral orifice, (2) dilatation of the urethra, (3) bimanual digital palpation of the bladder. I may say here that I have never found any difficulty under anæsthesia in dilating the urethra and exploring the neck of the bladder digitally by means of my graduated bougies (see p. 77). Kelly adopts Simon's limit of dilatation of 2 centimetres in diameter, 6 in circumference. Greenfeld employed an endoscope, a metal tube, blackened on its inner surface, and having 'a plain glass placed obliquely at its vesical end, using a frontal mirror with electric light for illumination, the woman being in the dorsal decubitus.' He estimated the

angle of the inclination of the speculum in viewing the ureteral orifice at 30° to 35°.

Rutenberg devised a speculum with a glass partition, and a little tube running down the side of the speculum, to which was attached a rubber ball for inflating the bladder with air. By means of a mirror, attached to a handle, which could be pushed in and out and rotated, the various parts of the bladder wall were inspected. To use this instrument it is necessary to dilate the urethra up to 2 centimetres in diameter (wanting a half-millimetre), and the patient must be under profound anæsthesia. Winckel, of Munich, commends this method, stating that he has used it ten times with great satisfaction.

'It has been my good fortune to work out a simple method which exposes the whole inner surface of the bladder, and the ureteral orifices, to a direct inspection without any intervening fenestra or mirror. By this method any gynæcologist, after a little practice, should be able in almost every case to catheterize either ureter within a few seconds after the introduction of the speculum. The bladder exposed in this way may be inspected with as much ease and more directly than the larynx, the posterior nares, or the fundus oculi.

Steps of Kelly's Method.—'The following instruments and accessories are required for the examination: female catheter; a series of urethral dilators; a series of specula with obturators; common head mirror and a lamp, Argand burner, or electric light; long delicate mouse-toothed forceps; suction apparatus for completely emptying the bladder; ureteral searcher; ureteral catheter without a handle; several bran bags or an inclined plane for elevating the pelvis.

'The bladder is first emptied as completely as possible by the catheter. A residuum of from one to several teaspoonfuls of urine always remains, even though the bladder is evacuated with the patient in a standing posture. In order to determine the proper dilator to begin with, I calibrate the meatus urinarius externus by means of a slender metal cone 10 centimetres long, marked in a graduated scale from its point, 2 millimetres, to

its upper end, 20 millimetres in diameter (see p. 5). The calibrator is pushed into the urethra as far as it will readily go, and the marking at the meatus externus noted. A dilator of the diameter indicated by the calibrator is then passed through the urethra by holding the handle at first well above the level

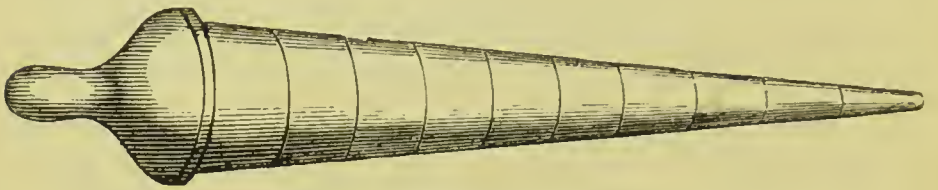


FIG. 502.—Kelly's Urethral Calibrator (the lines indicate the diameter in millimetres).

of the external meatus, upon which the point rests, and carrying the dilator on through the urethra and into the bladder by a gentle sweeping curve of the hand downward and inward toward the urethra.'

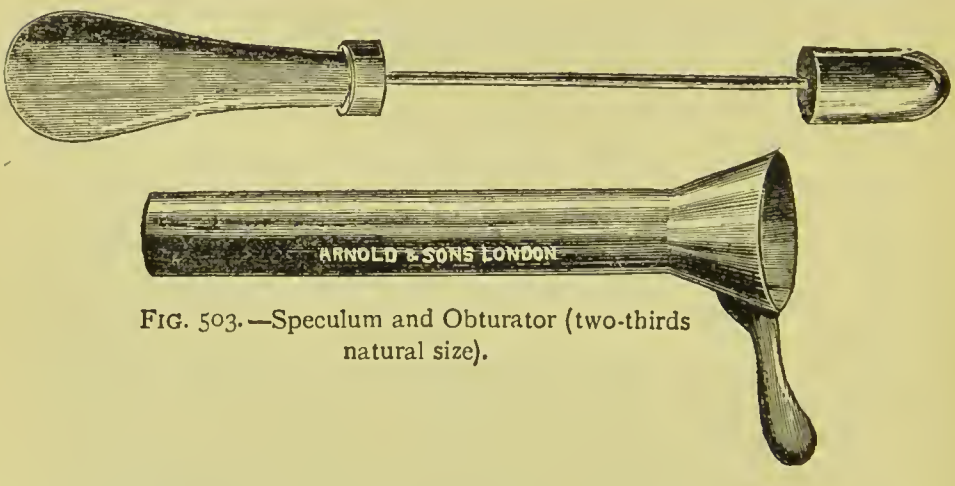


FIG. 503.—Speculum and Obturator (two-thirds natural size).

Kelly uses sigmoid-shaped conical dilators graduated in millimetres like the specula, and flattened in the centre for the purpose of grasping.

'By introducing the dilators as they occur in the series, the average female urethra can easily be dilated up to 12 millimetres in diameter with only a slight external rupture. I have

never seen a tear more than 2 or 3 millimetres in length and from 1 to 1½ in depth.'

I do not here figure the special dilators of Kelly. Those figured at p. 77 will answer every purpose.

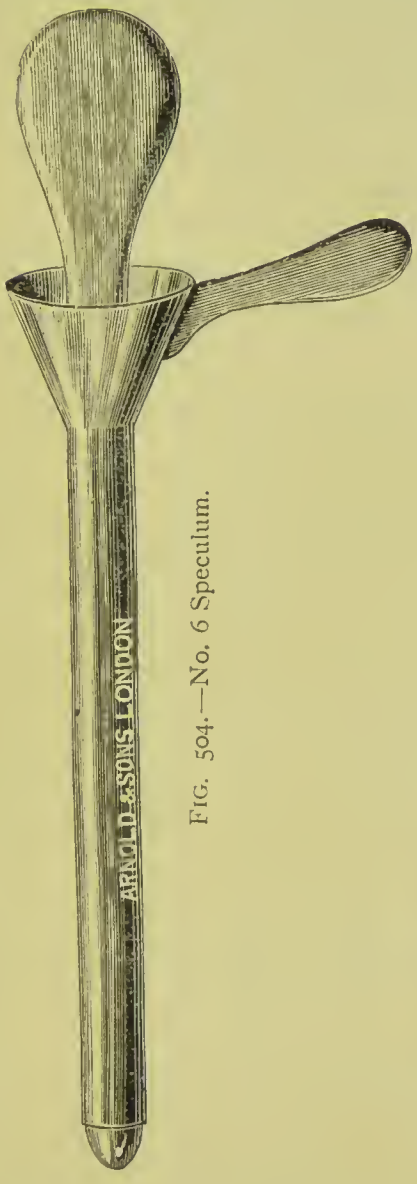


Fig. 504.—No. 6 Speculum.

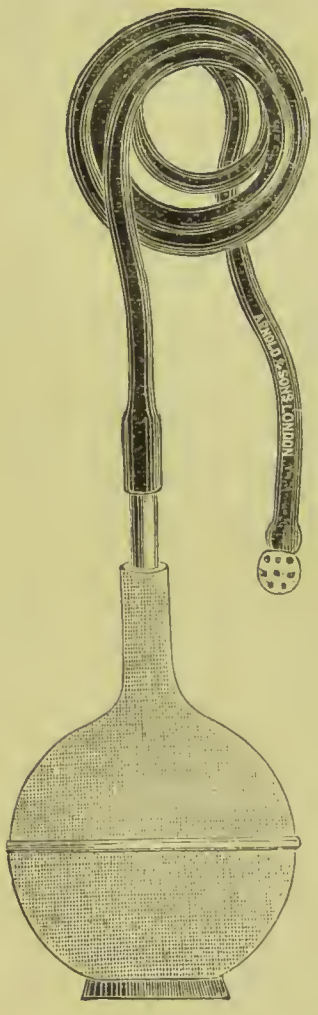


Fig. 505.—Howard Kelly's Sucker.

'As soon as a dilatation of from 12 to 15 millimetres is reached, a speculum of the same diameter as the last dilator is introduced, and its obturator removed.

'The *hips of the patient are now elevated* on the cushions,

or on a short inclined plain, 20 to 30, or even 40, centimetres (8 to 12 or 16 inches) above the level of the table (Fig. 501).

'There are sixteen specula (Fig. 504), varying from 5 to 20 millimetres in diameter, the successive sizes increasing by 1 millimetre. The specula are cylindrical, 9½ centimetres long, and each is provided with a conical mouth to assist in reflecting the light into the bladder. Each speculum is fitted with an obturator (Fig. 503). The calibre is marked in millimetres on a little handle at the side of the speculum.

'The examiner now puts on the head mirror and prepares to inspect the bladder. An electric drop light, an Argand burner, a lamp, or a candle in a dark room, is held close to the patient's symphysis pubis so that the light can be easily caught by the head mirror and reflected into the bladder. A good direct light from a window will also suffice.

'Upon withdrawing the obturator, the pelvis being elevated, the bladder becomes distended with air, and by properly directing the reflected light all parts of its interior are accessible to a direct inspection.

'If a pool of urine remain in the bladder, it should be withdrawn by means of a simple suction apparatus (Fig. 505). If there be a residuum of not more than 2 or 3 cubic centimetres, it can easily be removed by little balls of absorbent cotton grasped with long, delicate mouse-toothed forceps, the teeth of which are slightly recurved. The facility with which foreign bodies are removed from the bladder by this method can be demonstrated by dropping a pledget of cotton into the bladder —it can be seen with the utmost ease, picked up, and removed without difficulty.

'The posterior wall of the air-distended bladder lies 2 to 5 centimetres distant from the anterior wall, and over this white background, which first presents itself to the eye of the observer, is visible a beautiful network of branching and anastomosing vessels. The veins accompanying the arteries are easily distinguished by their dark colour. The larger vessels evidently come to the surface from the deeper layers of

the bladder, when they branch stellately, divide, and anastomose.

'By elevating the handle of the speculum the field of vision sweeps over the base of the bladder until in some cases the region of the inter-ureteric ligament comes into view, often marked by a slightly elevated transverse fold or a distinct difference in colour. By turning the speculum thirty degrees to one side or the other and looking sharply, a ureteral orifice is discovered. While inspecting the ureter I have frequently observed little jets of urine ejected at short intervals, like a miniature fountain; in pathological cases I have seen pus and blood flowing from one ureter while the other discharged normal urine.

'The ureteral orifices and their surroundings are not constant in appearance. Sometimes the orifice appears as a dimple or a little pit, or, in inflammatory cases, as a round hole in a cushioned eminence; at other times as a round hole with the point directed outward; again, it may be scarcely visible even to a trained eye, appearing as a fine crack in the mucosa, and occasionally is so obscure as to be recognised only by the jet of urine as it escapes, or by a slight difference in the colour of the mucous membrane at that point. In rare cases it has the form of a truncated cone with gently sloping sides; this appearance is most apt to be developed in the knee-breast position.

'The bladder mucosa is usually of a slightly deeper rose colour around the ureter, and in the presence of an inflammatory process it even appears deeply injected.

'In the direct inspection the ureteral orifice always appears to lie nearer the urethra than one would anticipate. This is a result of the illusion produced by the foreshortening of the base of the bladder.'

Hyperæmia of the Trigone.—Irritation of the neck of the bladder, in the region of the ureters, is a commonly recognised condition. A scalding sensation in passing water, frequency in micturition, with pain, are the prominent symptoms. In the case of a patient on whom I operated some years since for

carcinoma of the cervix, I found that any application of carbolic acid in the weakest solution in the vagina, or even an examination with carbolized vaseline on the finger, immediately produced intense vesical irritation. Excessive acidity of the urine, errors of diet, slight cold contracted from chill, after operations for hæmorrhoids, the passage of a catheter, or rudeness in coitus, are some of the most frequent sources of this vesical irritation. The urethra is intensely sensitive to the catheter, and its orifice is sometimes found red and slightly swollen. Howard Kelly has examined by his method patients suffering from this condition, and has found the entire bladder sound with the exception of the trigone area. He recommends the application directly through the endoscope of a 3 per cent. solution of nitrate of silver on a piece of cotton, rest, demulcent drinks, and the internal remedies recommended in cystitis, which generally afford speedy relief.

Matthew Mann, of Buffalo, has rightly insisted on the reflex ovarian pains, the occurrence of ureteritis as well as the irritation of the bladder, that may follow upon simple acidity and condensation of the urine. At the same time, it is right to observe that the error the surgeon is most likely to fall into, is not neglect of examination of the urine for any bladder trouble, but, as has been already pointed out, the omission of seeking for an explanation in some outside source, such as a uterine displacement, a tumour, or possibly hæmorrhoids.

Cystitis—*Causation.*—This is an affection which the gynæcologist has constantly to deal with, whether as the consequence of gonorrhœa, exposure to cold, pelvic inflammatory conditions, or following traumatic causes, either operative or as the result of direct violence.

The principal causes are:

Exposure to cold.
Parturition.
Habitual neglect of the bladder.
Gonorrhœa.
Stone.
Tumours.
Unclean catheters or bougies.

Uterine displacements.	Excessive coitus.
Morbid states of the urine.	Parametritis.
Gout.	Operations.
Urethritis.	Injuries.

Symptoms. — The symptoms are: increased frequency in passing water, irritability at the neck of the bladder, with pain during, and immediately after, the act of micturition. If the affection be chronic, in addition to the frequency of passing urine and the pain present in the acute affection, the patient's health becomes generally impaired, and there is pain in the perinæum and down the thighs or in the supra-pubic region. Pain is also experienced on a vaginal examination if the bladder be pressed on by the finger.

The urine is generally alkaline and phosphatic; it contains a quantity of mucus, decomposes rapidly, and has a very offensive odour. Gradually the bladder becomes contracted, and a smaller quantity is retained. Later on, when the ureters and kidney are inflamed, uræmic symptoms may be present, and pus as well as mucus is detected in the urine.

Changes in the Bladder.—If the affection be not cured, after a time congestion and epithelial desquamation are followed by thickening and rugosity of the mucous membrane, with general thickening of the muscular and connective tissue. The orifices of the ureters are encroached on, the tubes all become dilated and are generally thickened. The disease travels slowly but surely backwards; the kidneys finally yield to the pressure and distension, and they in their turn become diseased. Ulceration and pus accumulation occur both in the bladder and ureters.

Course and Termination.—An acute attack of cystitis, due to cold or traumatic cause, if properly attended to, with rest and suitable medication, is generally amenable to treatment. Not so the chronic form. The prognosis is most unfavourable, chronic catarrhal cystitis being a most intractable affection, pursuing the course above indicated with all the attendant symptoms.

Treatment.—In acute cystitis the treatment will consist of: Rest in bed, and warmth; demulcent drinks; milk diet; linseed tea, flavoured with clove. Lithia, Salvator, Ems (sodium-lithium spring), Contrexéville, soda, or potash waters may be given as drinks.

As medicines—

Decoction of pareira.
Infusions of buchu.
„ „ uva ursi.
„ „ scoparium.

These must be given in one-ounce doses, in combination with the tinctures of hyoscyamus, buchu, or uva ursi, with liquor potassæ, or potassium bicarbonate and ext. hamamelis liq. Large draughts of decoction of triticum repens are sometimes soothing.

A warm bath will occasionally relieve pain, and a morphia suppository may be placed in the rectum.

An admirable mixture I find is:

℞. Liq. potassæ, ℥iss.
Tinct. uvæ ursi, } āā ℥ss.
Tinct. buchu, }
Tinct. hyoscyami, ℥ii.
Elixir saccharin., min. xxx.
Inf. scoparii, } āā ℥iv.
Decoct. pareiræ, }

℥i. three times in the day. M.

Either uva ursi or buchu may be substituted for the broom infusion. Lithiated hydrangea given in ℥i. doses in combination with hamamelis will be found very useful.

The bowels must be regulated if necessary by an emollient enema, and such saline aperient waters as Friedrichshall, Pullna, Æsculap, Victoria, Rubinat, or Hunyadi Janos, may be given.

The oil of copaiba or cubebs or santal, in small doses, may be tried suspended in the mistura amygdalæ comp., especially

LEEDS & NI... MEDICO-CHIRURGICAL SOCIETY

in those cases of a specific nature. In the latter stages the benzoate of ammonia may be taken in fifteen to thirty grain doses. Vegetable diuretic infusions may then be discontinued, and the mineral acids commenced. Matico in infusion and tincture I have found useful combined with hamamelis. Contrexéville is the water I have most frequently given in vesical irritation with benefit. The bladder should in all obstinate cases be washed out at least twice daily with some extremely weak antiseptic lotion, such as boric acid, carbolic acid, salicylic acid (a few grains to the ounce), or corrosive sublimate (1 in 10,000). This may be done with a double catheter and syphon-tube. Hæmorrhoidal conditions require attention. Uterine displacements should be rectified.

If general and local treatment fail, Emmet's operation of cystotomy, to give the bladder rest through the creation of a vesico-vaginal fistula, may be performed. He advocates this step strongly, going so far as to say that 'our means for curing cystitis are limited to a single procedure, that of vaginal cystotomy, and all other means yet known to us are but adjuvants.'

The operation consists in the following steps:

1. Placing the woman as described in the button-hole operation on the urethra.

2. Introducing a curved sound or a fenestrated staff of Harris into the bladder.

3. Seizing the projected vaginal tissue with a tenaculum in the middle line, which is then divided with a pair of scissors so that the sound may be passed into the vagina. The vesico-vaginal septum is then divided in the median line.

4. Uniting the vaginal and vesical edges by sutures, as before described.

Pallen used a Paquelin's cautery to open the bladder. Emmet disapproves of this method, inasmuch as there is risk in some cases of injuring the bladder or ureters. Afterwards the bladder is freely washed out through the opening with warm water. In due time, if the cure be complete, the fistula is closed.

Stone in the Bladder.—The symptoms of stone are :

Frequency in passing water.
Pain principally felt after passing.
Presence of blood in the urine.
Presence of phosphates and mucus.

The stone is felt by the sound or finger.

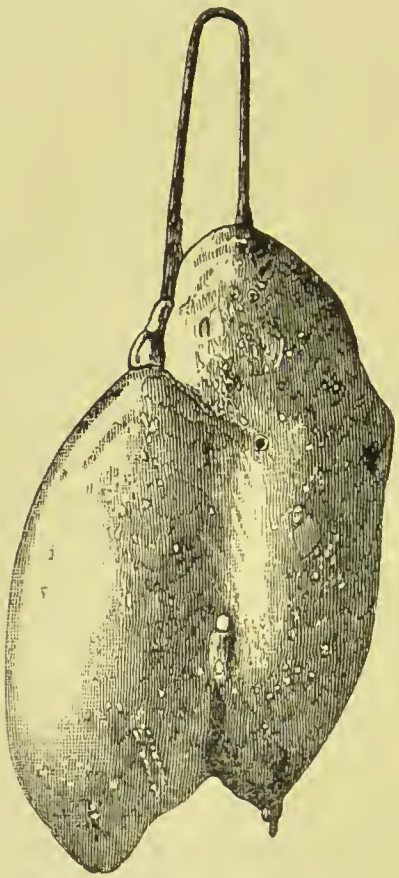


FIG. 506.—Hairpin Calculus (Kelly).

Foreign bodies form the nuclei of calculi. Howard Kelly records this interesting case. The hairpin was introduced by the patient, a young unmarried woman, who married a short time afterward. She passed through a confinement without any injury to the bladder, although the calculus had already formed about the pin and was felt by the doctor in attendance, who

pushed it up into the abdomen while the head was descending through the pelvis. No explanation could be obtained from the patient as to how the hairpin got into the bladder, but the mother, who saw it after removal, declared that she must have swallowed it.

Litholapaxy (Lithotrity at one sitting).—To Otis, of New York, we owe the teaching which has established the possibility of introducing large instruments into the bladder. To Bigelow we are indebted for the modern operation of crushing stone in the bladder, and removing the fragments at one sitting by aspiration. The operation is performed thus : The presence and size of the stone having been determined, the patient is placed under ether in the lithotomy position. If no urine be in the bladder, a few ounces of warm water are injected. The lithotrite is introduced, and the stone is crushed. (The student is familiar with the more minute description of this step, and the details of the operation of lithotrity in the case of stone in the male bladder.) The large evacuating catheter is now introduced, and if the urine is in the bladder it is withdrawn. The modern improved aspirator is then attached to the catheter, and about three ounces of warm water is injected into the bladder. With the outflow the fragments are received into the glass bulb attached to the aspirating bag. Larger fragments which remain are crushed and removed in the same manner. Other details of the operation, as, for instance, the method of seizing and crushing the stone, the removal of all the débris, the freeing of large particles, are the same as in lithotrity on the male. The woman may be given a warm hip-bath and an opiate some hours after the operation, if there is pain. Alkaline drinks are indicated, and any symptoms of cystitis attended to.

P. J. Freyer (St. Peter's Hospital), who ranks amongst the most expert of living lithotritists, remarks that of a series of litholapaxy operations, all turning out successful, there were thirteen cases of stone in females. One woman, from whom he removed a stone over an ounce in weight, was seven

months pregnant, and made an excellent recovery. The only special difficulty met with in this operation in the female is in retaining water in the bladder during its performance. Owing to the shortness and width of the urethra, the water rushes out beside the instruments. 'This I now obviate by getting an assistant to place the fore and middle fingers of one hand in the vagina and press the posterior lip of the urethra against

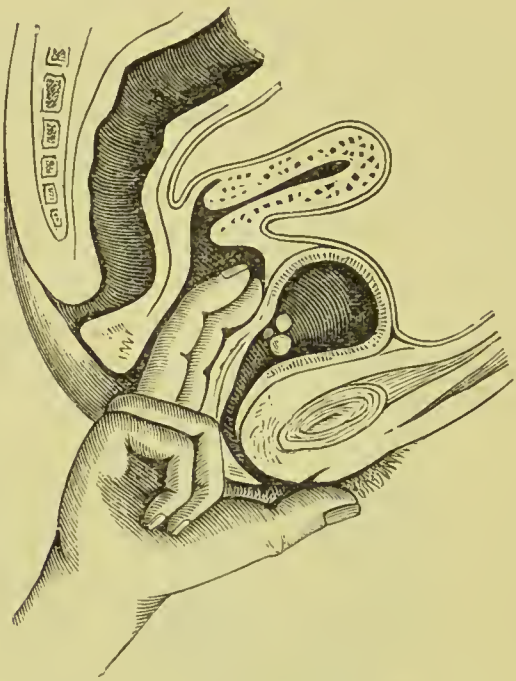


FIG. 507.—Croom's procedure.

the lithotrite or cannula, a manœuvre which prevents the water from rushing out.'

Vagino-Vesical Lithotomy.—If either from the size of the stone, the state of the bladder, or the condition of the health of the woman, the operator should wish to perform lithotomy, an opening is made of sufficient size in the vaginal septum, and the stone is extracted. The bladder is subsequently washed out by the urethra, and the vaginal wound treated as a vesico-vaginal fistula.

Removal of Small Calculi by the Fingers.—Croom recom-

mends that the fingers be used (Fig. 507) for pushing small calculi from the bladder into the urethra, and through it from the meatus. If the urethra be dilated, this proceeding is facilitated. This plan is limited to stones no larger than the finger-tip.

Treatment of Incontinence by Forcible Dilatation of the Bladder (*H. Marion Sims*).—H. Marion Sims, of New York, advocates for incontinence of urine in young girls forcible dilatation of the bladder with success. In all the patients the bladder was so contracted that it held but a few ounces, or less; in one case, that of a girl of thirteen years of age, it only held three-quarters of an ounce. The plan adopted is the daily injection of comfortably warm water into the bladder to the point of distension, increasing the quantity by half an ounce to an ounce each day until the retaining power of the bladder is improved; then it is practised every second day, and finally once in the week. He has succeeded in getting these patients to retain twelve and eighteen ounces comfortably. In some cases he combined the use of a mild faradic current applied to the neck of the bladder with the dilatation.

Alexander's Operation for Incontinence from Fistula.—William Alexander brought before the Gynæcological Society, April 25, 1888, 'a method of treating incontinence of urine in the female in cases hitherto considered to be beyond the resources of surgery.' The principle of this method consists in conveying the urine into the rectum, and converting the anus into the permanent channel for its escape. The anal sphincters are thoroughly dilated; the base of the bladder is pushed into the rectum with the finger, on which the rectal wall is divided, so as to form a communication between the bladder and rectum, into which one end of a vulcanite stud is inserted, so that the flat head of the stud is in the bladder and the screw-end protrudes into the rectum; on this the other end of the stud is screwed, and a permanent opening is thus secured between the bladder and rectum. The next step in the operation consists of complete closure of the vulvar orifice by separating the labia minora from the labia majora all round, and turning the epithelial surface of the former towards the bladder, suturing these, and, finally, completely closing the latter. This operation has given rise to a good deal of criticism; but it must be remembered that the condition for which it is proposed is a desperate one, and if by it we can better succeed inclosing completely the vulvar orifice, and the diversion of the urinary stream does not make the woman's condition worse through rectal irritation, this ingenious device of Alexander is worth a trial.

Tumours and Growths.—Carcinoma, papilloma, sarcoma, and fibroma are found in the bladder. Polypi occur rarely, save in the case of children. The symptoms of bladder growths are often obscure. The most characteristic symptom of malignant disease is hæmorrhage. Hæmaturia may not, however, take place for a considerable time after the earlier

symptoms of frequency in passing water and slight suprapubic pain have been complained of. The hæmorrhage often is periodical. An interval of time elapses, and then the bleeding continues for a short time and again ceases. In other instances it is persistent and alarming. In any case of hæmaturia, the first point to decide is the source of the blood, and next, having localized this in the bladder, to determine by cystoscopy if the cause be a tumour, and, if so, the size, and if possible the nature, of the growth. I have just removed from the bladder a large sarcomatous growth per urethram in the case of a patient who returned from a Continental spa after a prolonged course of local and general treatment, assured that there was no growth present.* The case was diagnosed as cystitis and general contraction of the bladder. There was occasional profuse hæmaturia. This had lasted for three months. *The vagina was never examined*, or, if it had been, the growth, involving the neck of the bladder, would have been felt immediately. A truly objective lesson in diagnosis!

Treatment.—The most potent remedies to check hæmorrhage are gallic acid, hamamelis, ergot, matico, uva ursi, turpentine. For removal of the growth, different procedures must be adopted according to its size and character. If the growth be small and soft, and situated in the neck of the bladder, it may be removed piecemeal through the dilated urethra by forceps, or by combined dilatation and incision through the vagina. Large tumours of a solid nature must be removed by vaginal cystotomy. In other and still rarer cases suprapubic cystotomy may be called for.

* For this case I am indebted to Mr. Thomas Parsons, of Wimbledon. Mr. Torgert, of the Clinical Researeh Assoeiation, to whom I am indebted for several important pathologieal reports, described this growth as 'a mixed-eell sareoma, very vascular, eovered with sloughened sareomatous tissue, with giant eells here and there interspersed.'

CHAPTER XLIII.

THE URETERS.

The principal affections of the ureters that require attention on the part of the gynæcologist are :

Ureteritis.
Hydro-ureteritis.
Pyo-ureteritis.
Calculus.
Stricture.
Ureteral fistula.
Ureteral prolapse.
Wounds

Ureteritis.—The causes of ureteritis are, according to Mann, injuries during parturition, vesical disease, gonorrhœa, pyonephritis, abnormal urine, tuberculosis, and such pelvic affections as peri-uterine phlegmon, peritonitis, and tumours. Septic conditions of the bladder may infect the ureters. The pathological consequences of the ureteritis are seen in epithelial desquamation, ulceration, and purulent secretion. Such conditions bring about considerable thickening of the tube.

Symptomatology.—Frequency of micturition, and boring pain in the course of the ureters. Mann notices specially the mental depression attending on these cases.

Treatment.—The treatment may be either constitutional or surgical. In the former case a careful regimen should be insisted on, and an efficient hygiene. No alcohol should be

allowed. Much the same remedies as those advised in cystitis are indicated. A buttonhole operation of the bladder may relieve the incontinence, or the ureters may be dealt with directly by Howard Kelly's local treatment by astringents and antiseptic applications.

The diagnosis of any one of the remaining affections above tabulated must depend upon the most exact method of examination and exploration. In order, then, to arrive at the best means of discovering each of these obscure conditions, I give here, practically in his own words, the directions for carrying out the plan adopted by Howard Kelly. I have already, in discussing the surgical treatment of uterine fibromata, referred to the secondary renal effects which follow, both from pelvic inflammations and tumours pressing upon and involving the ureters, as also their implication during the different operations for hysterectomy. At pp. 32-34 the anatomy of the ureters and their course is dealt with. The fact that they are quite accessible to exploration has been demonstrated by Kelly. For the landmarks for finding the orifice of the ureter and its palpation, the reader should refer to pp. 34 and 35.

Catheterization and Exploration of the Ureters by Howard Kelly's Method.

Appliances required.

'Two Kelly's ureteral catheters.
'One small calibre female catheter.
'One syringe, with a graduated barrel, of 4 or 5 oz. (120-150 c.c.) capacity.
'Eight ounces of a decided blue aniline solution.
'One Sims' or Simon's speculum.
'Two minim or cubic centimetre graduates of about 60 minim capacity.

Preparation of Patient (*see p.* 773).

'Many patients can be catheterized without anæsthesia. The buttocks should be brought to the edge of the table, and the legs flexed upon the abdomen. Bran bags or an inclined plane are used to elevate the pelvis. The operator then catheterizes the bladder. This urine is set aside in a conical glass vessel for comparison with that to be obtained from the kidneys. The value of this

Howard Kelly's Appliances for Ureteral Catheterization.

FIG. 508.—Ureteral Catheter with reduced handle.

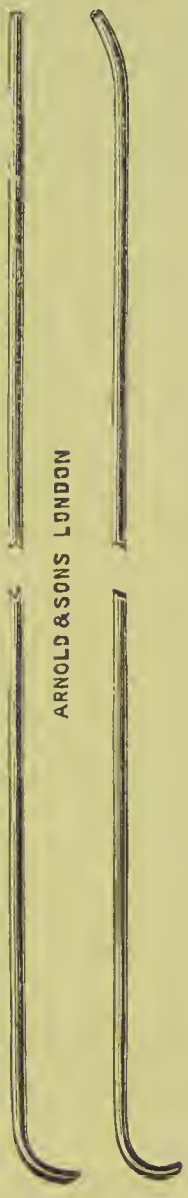


FIG. 509.—Ureteral Catheters without handles.

FIG. 510.—Toothed Forceps.

FIG. 511.—Ureteral Searcher.

will be seen when I say that I have repeatedly been able, upon drawing purulent or bloody urine from the bladder, to produce the same shade of red or yellow as that of the vesical urine by mixing pure urine obtained by the ureteral catheter from one kidney with the bloody or purulent urine drawn from the other. By careful palpation the ureters are located anteriorly through the vaginal wall, noting especially whether they are well forward under the bladder, or, as often found, abnormally far back in the pelvis.

Steps of Method.

'The bladder is then distended with from 5 to 7 oz. (150-210 c.c.) of the aniline solution. The posterior vaginal wall is retracted with a speculum, exposing the anterior wall up to the cervix, while the bladder is being injected.

'The object of this distension of the bladder is twofold: in the first place it does away with all the rugosities of a contracted bladder, which hinder catheterization, if they do not render it impossible. The only rugosities left are the prominences on either side, through which the mouths of the ureters open into the bladder by a little slit, running obliquely backward in a line with the course of the ureters.

'The second reason is well exhibited pictorially by Professor Pawlik, who was the first to demonstrate that the curved folds which cross the anterior vaginal wall out to the lateral walls and around toward the cervix are valuable landmarks in finding the ureters, which lie parallel to and just above them. These are appropriately called for this reason the "ureteral folds." They are brought out distinctly by moderate distension of the bladder.

'An assistant should determine that the catheter is clear by placing the end in water, and blowing through it without touching it with his lips. The metal plug, attached by a short chain to the catheter, is coated with a little vaseline, and inserted in the outer end, thus keeping the aniline solution from filling the lumen of the catheter when it enters the bladder.

Passage of Catheters.

'*In order to carry the ureteral catheter or sound over the brim of the pelvis, it is not necessary to use a flexible instrument* (Fig. 509). This can be effected by first filling the bladder with sufficient fluid (150-200 c.c.) to distend its folds and introduce the catheter into the ureter, and then drawing off all the contents of the bladder; a finger introduced into the rectum high up gently lifts the catheter, and assists it over the brim and on up into the abdomen. This manœuvre is rendered possible by the loose cellular tissue in which the pelvic organs lie allowing a wide displacement of bladder, ureter, and broad ligament without injury. The contracted bladder can be lifted up, while it is impossible to displace the full bladder in this way.

'It is now evident that if clear or straw-coloured fluid escape through the catheter it must be urine, as the deep aniline colour of the fluid in the bladder renders deception from that source impossible. When the catheter is introduced as far as the bladder, touch and sight assist in its further introduction into the ureter.

'By turning its point forward and elevating the handle, a slight prominence is produced on the anterior vaginal wall. Throughout the manipulations of the catheter this is the constant guide to the vesical orifice of the ureter. The first step after the introduction of the catheter into the bladder is to try to locate the ureteral eminence by the sense of touch communicated from the tip of the catheter.

'To this end the movements of the point on the anterior vaginal wall are closely watched as it plays over the base of the bladder. It is made to gently glide in a fore and aft direction from the neck of the bladder to the cervix, in the

median line, a little to one side, a little further out, and so on until it reaches the ureteral eminence, when it is distinctly felt to trip, jogging the thumb and finger in which the catheter is held.

'The same movement is repeated until this point is exactly located. The attempt is now made to introduce the catheter into the ureter by carrying the handle to the opposite side, thus directing the point toward the posterior lateral wall of the pelvis, when the catheter is withdrawn slightly, and with its point still down, but turned a little more toward the side, is swept downward, outward, and backward in the direction of the ureteral prominence. With each of these sweeping motions the catheter is rotated until the point is directed fully outward or slightly upward.

'This movement, employed in engaging the catheter in the ureter, may very appropriately be called *fishing* for the ureter.

'As soon as the catheter enters the ureter its course is fixed, and the tactile sense at once recognises that it no longer lies free in the bladder as before. If the catheter be released for a moment the handle does not drop, but remains in a fixed position and forms an angle, of about 30°, with a line projected from the urethra. The catheter should be carried into the ureter until its point reaches the wall of the pelvis, when the plug is removed from the end. Another may now be introduced into the opposite ureter, and both be thus catheterized at the same sitting.

'On account of the partial occlusion of the urethra by the first catheter, the second is slightly more difficult to introduce.

'If it be desirable to carry the catheter higher, even over the brim of the pelvis and up to the pelvis of the kidney, the bladder can be emptied by introducing a small glass catheter under the two ureteral catheters. The contracted bladder now forms a movable organ, which can be displaced upward without harm in manipulating the ureteral catheters.

'With an index-finger introduced into the rectum, the catheter is lifted up and guided while it is pushed on up over the pelvic brim and up to the pelvis of the kidney.

'As soon as the plug of each catheter is withdrawn, an assistant notes the time, so as to be able to tell afterwards just how long the urine has been flowing from each kidney. The minim graduates are held below the catheters to catch the urine. An average of 1,500 c.c., or about three pints, is the normal daily excretion of urine. If from both catheters one cubic centimetre a minute, or half a cubic centimetre from one catheter, is passed, the number of minutes in a day multiplied by this amount gives 1,440 c.c., which is practically the normal excretion. I have frequently found just this proportion upon estimating the day's urine by the amount collected in a few minutes by the catheters.

'Oftener the amount falls much below normal. In disease there is frequently a marked difference in the amount of urine collected from the two sides. One side may flow freely and the other discharge no urine, although this may be due to stricture, which I have demonstrated by pushing the catheter up beyond the stricture and over the brim of the pelvis, when immediately several ounces escaped. One side may be alkaline and the other acid; one may be bloody or pure blood and the other clear urine; one may be pus and the other urine.

'The urine evidently flows from the kidney in little wavelets. It does not

appear at the end of the catheter for from one to eight or ten minutes, and then it only escapes by drops at intervals of a few seconds to a minute or more.

'Fifteen minutes is an average time for the duration of the catheterization. The urine of each side is then marked and set aside for examination. The catheters are plugged and withdrawn, and the urine in each of them is added to that in the graduate from the same side. A little patience and tact, as I have said, are all that is needed to succeed in this little manœuvre, which adds so much to the possibilities of gynæcology, as it brings into this special branch of surgery renal diseases in the female.

'A valuable aid for the beginner searching for the ureteral orifice is as follows: A point is marked on the cystoscope, 5½ centimetres from the vesical end, and from the point two diverging lines are drawn towards the handle, with an angle of 60° between them. The speculum is introduced up to the point of the V, and turned to right or left until one side of the V is in line with the axis of the body; then by elevating the endoscope until it touches the floor of the bladder the ureteral orifice will usually be found within the area covered by the orifice of the

FIG. 512.—Showing the use of Ureteral Searcher before Catheterization. The light is thrown on the mirror by an electric lamp held by the assistant.

speculum. The ureteral orifice can often be found by an adept at once, and almost instinctively, by a single movement of the speculum after its introduction into the bladder.

'In order to ascertain whether it be the ureter which lies within the field, I use as a searcher (Fig. 512), a long delicate sound with a handle bent at an angle of 120°, which is introduced through the speculum into the suspected ureteral orifice, and the lateral walls of it are slightly raised, appearing as distinct folds with a dark pit between them. The searcher may be withdrawn and a ureteral catheter at once introduced, if it is desirable to collect the urine direct from the kidney. The ureteral catheters which I use for direct catheterization are quite different from those heretofore employed. They are straighter, and

either have no handle or only a small one which will readily pass through the No. 10 speculum (p. 775).

'The genu-facial position is indispensable in those cases in which, owing to disease, the bladder will not balloon out in ordinary posture; but Kelly has frequently succeeded in the dorsal and left semi-prone positions if the pelvis were moderately elevated.'

Example of the Value in Diagnosis of Kelly's Method in Hæmaturia.

'In two cases the patients had been weakened and rendered profoundly anæmic by a prolonged persistent hæmaturia of uncertain origin. Proceeding to catheterize the ureters for the purpose of making a diagnosis as to its source, I collected and preserved the urine in the bladder, which was of a deep-red colour, due to the presence of large numbers of red blood corpuscles. The bladder was washed out, and the blue aniline solution injected. A catheter was then introduced into each ureter, and in one case from the right, and in the other from the left catheter, red drops, apparently of pure blood, were discharged at intervals, while from the opposite catheter clear urine flowed. Upon mixing the two I secured a fluid of the same shade of red as that drawn from the bladder before injecting the aniline.'

Hydro-ureter as the consequence of stricture or impacted calculus, which leads to dilatation and distension of the tube with urine, and *Pyo-ureter*, the consequence of pyo-nephritis and cystitis, may be diagnosed by Kelly's method. Septic pyelitis or cystitis, arising from various causes, may involve the ureter.

A case of such practical interest, illustrative of the value of his method, is quoted by Kelly that I reproduce it here:

'Mrs. G. was losing flesh and feeling utterly prostrated, but without any pain or definite complaint. I found a large quantity of pus constantly in the urine. In the right groin was a fluctuant swelling, not tender on pressure, believed to be an enlarged right kidney. The important questions were, "Does the pus come from this kidney?" "Is the other kidney sound enough to do the work of two if the right is removed?"

'After emptying and washing the bladder clean and injecting the aniline solution, I passed catheters into both kidneys. From the left came pure, clear urine. On the right side nothing came after waiting for ten minutes. The catheter was withdrawn, and a little pus found in the eye. It was reintroduced and carried higher (passing a stricture below the brim) well up into the abdomen, *when drops of pure pus at once began to flow into the collecting vessel. I then without fear cut down into the right kidney and opened a large abscess*, letting out about 500 c.c. of pus, and removing a large calculus,

choking the pelvis, projecting into the ureter and into the kidney substance, and a number of smaller calculi. The patient made a perfect recovery.'

Calculus is more frequently arrested in the upper portion of the tube near the pelvis of the kidney. The symptoms of stone in the ureter are often very obscure. The method of palpation of the ureter has already been referred to, in treating of the anatomy of the tube. By this means, if the stone be low down in the neighbourhood of the bladder, it may be felt through the rectum or the vagina. A preliminary examination having been made to confirm the suspicion that attacks of ureteral colic arouse, the patient is placed in the position generally availed of in examination for renal calculus, and the lumbar region is carefully and bimanually palpated. Distension from hydro-nephrosis may be detected. Then, in the dorsal decubitus, it may be possible, by pressure in the course of the ureter, to detect a specially painful and circumscribed spot.

A stone may protrude through the urethral orifice, or it may invest the ureter, and thus form a sort of sack, in the centre of which lies the calculus. Possibly this might be mistaken for a tumour.

Calculus in the ureter may, *if felt* by the finger, be removed through the rectum or the vagina, and possibly, if partly protruding, by the bladder. If in other situations, the operation of retro-peritoneal ureterotomy has to be performed, by which step the ureter is reached between the kidney and the true pelvis. After the removal of the stone by a longitudinal incision, the ureter is sutured.

Stricture.

Hydro-ureter and Stricture.

By the same method Kelly has demonstrated cases of hydro-ureter and stricture (p. 795). In the latter case he introduced a sound into the ureter, and cut down upon it in the vault of the vagina, just in advance of the cervix, laying it

open for one centimetre, and suturing it to the vaginal mucosa with delicate needle and fine silk, making an artificial ureterovaginal fistula. Through this latter he dilated the stricture several times, and this being overcome, the fistulous opening was finally closed, though in this case a final nephrectomy was necessitated from the occurrence of tuberculous ureteritis and nephritis, which were demonstrated by the presence of tuberculous bacilli.

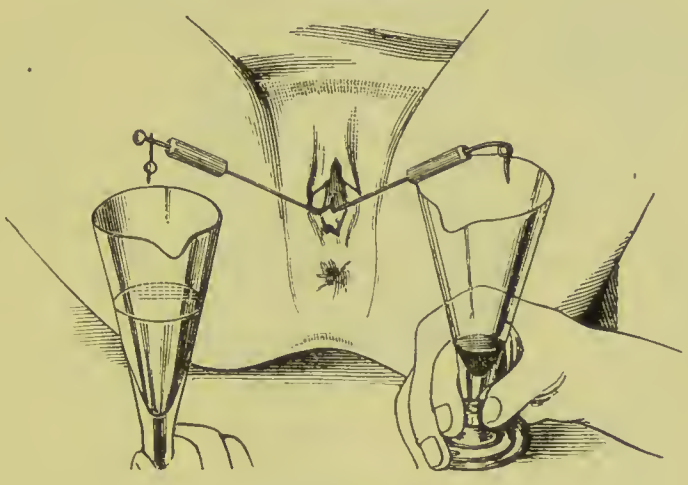


FIG. 513.—Stricture of Right Ureter demonstrated by Catheterization. Catheter passed up above stricture, followed by a rapid, continuous flow of urine, while urine escaped by drops in much less quantity from opposite side. Difference in quantity of urine obtained in the same time from both ureters shown in conical glasses.

FISTULA.

'The *diagnosis* of ureteral fistula,' says Kelly, 'will be made by noting: first, that, although there is a constant escape of urine, the patient still passes urine at regular intervals; second, that upon injection of sterilized milk into the bladder, none of it escapes through the vagina, while the urine still escaping from the vagina continues clear; third, that by placing the patient in the dorsal position with elevated pelvis, or in the knee-breast position, the ureters may be catheterized as described, and urine collected from one side while no urine

escapes from the other; fourth, that the sound may be readily entered into one ureter and passed back to the posterior wall of the pelvis, while in the other it cannot be pushed in more than a few centimetres; fifth, in the congenital malformation where there is a double ureter on one side with one of its openings near the urethra, and the other in the bladder, the evidence that the fistula is not vesical will be obtained by the

FIG. 514.—The Field of Operation through the Superior Strait. The bladder is freed from its connections above and dislocated downwards, and on the right side backwards to meet the short ureter. Its superior surface is seen uncovered by peritoneum. The angle in the middle is the lower terminus of the abdominal incision; the extent of the displacement of the bladder can be estimated by this. Forceps hold the ureter in place until the sutures are passed. A part of the ureter is seen lifted up free from the pelvic floor.

injection of milk. The catheterization of both ureters will demonstrate also that they are pervious and functionally perfect.'

Perhaps the most concise manner of describing the closure of a ureteral fistula is to take the description from Howard Kelly of the closure of a ureteral fistula in the vault of the vagina that resulted from a vaginal hysterectomy. He first injected sterilized milk into the bladder to prove that that

viscus was uninjured. I give the rest of the operative procedure in his own words:

'To decide which was the severed ureter, I placed the patient in the knee-breast position and placed my No. 10 cystoscope, when the bladder filled with air and I was able to inspect the ureteral orifices. By introducing a searcher into the left ureteral orifice, I found that this ureter was intact

2. Schematic section showing the way the ureter was held by forceps, and the relation of the sutures to the coats of the bladder and the ureter. All but the mucous coats of both were included.

3. The appearance of the ureter entering the opening in the bladder. One suture laid in place, but not tied.

4. Shows the snug union of ureter to bladder after both deep and superficial sutures were applied.

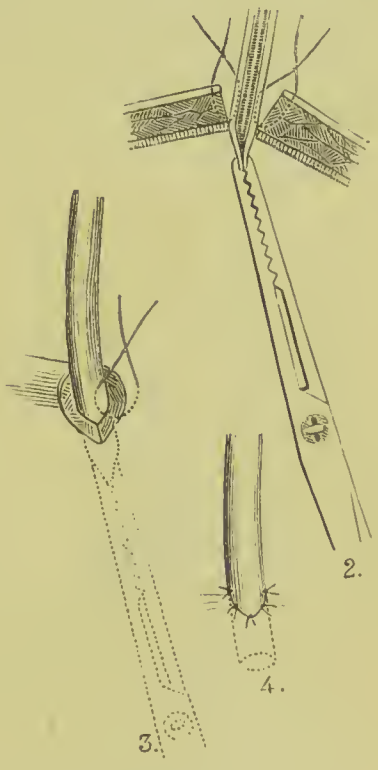


FIG. 515.

as far as the posterior wall of the pelvis. Upon introducing the searcher into the right ureteral orifice, it could not be carried in more than two centimetres, on account of meeting an impassable obstruction. The urine was seen flowing from the left ureteral orifice, while nothing escaped from the right side. The demonstration was thus complete, that it was the right ureter which was injured, and the left was intact.

'Having cleared up the diagnosis in this way, I proceeded

to operate to relieve the condition, October, 1894, seven weeks after the original operation by Dr. Russell.

'Operation: The patient was placed in the Trendelenberg position, and an incision 12 cm. long made through abdominal walls loaded with fat. Every step throughout the operation was embarrassed by the obesity of the patient. After opening the abdomen, the large fat omentum and intestines were dislodged from the lower abdomen and pelvis with great difficulty, and held away by means of cotton gauze pads.

'The end of the ureter could not be found on the pelvic floor on account of the rigidity and inflammation surrounding the line of scar tissue between the rectum and bladder. The right ovary and tube were also pinned down to this scar tissue by numerous vascular adhesions. The attempt to reach the ureter at this point was therefore abandoned, and it was sought out at the pelvic brim, where it was readily found, after lifting up the caput coli and incising the peritoneum and pushing aside the fat. It was then traced from the point of crossing the common iliac artery down to the pelvic floor, exposing the whole length of the pelvic portion by splitting the peritoneum over its upper surface. The anterior portion of the ureter was involved in the inflammatory material surrounding the scar, which bled so freely that no attempt was made to dissect it out. Four centimetres of the length of the ureter lying directly posterior to the scar tissue were dissected out, and the ureter lifted up from its bed and divided close to the scar, sacrificing as little as possible of its length.

'I now found that, although I had cut the ureter to the best advantage, I could not do more than merely bring it into contact with the bladder by pulling on it. It was of course evident that if I were to suture it to the bladder, exercising this degree of traction, it would pull out soon after the operation, and I would have a uretero-abdominal instead of a uretero-vaginal fistula to deal with.

'I was able to cope successfully with this formidable difficulty in the following manner: The bladder was dissected

free from its attachments to the horizontal rami of the pubis on both sides with scissors and fingers, and dropped down into the pelvis so as to extend it and carry it more into the back part of the pelvis, gaining at least 3 cm. in this way. By this means the ureter and the bladder were easily approximated without strain. I then made a small incision through the bladder wall, covered with fat at least a centimetre thick, at the point on the right nearest the ureteral end drawn straight across the pelvis. This incision passed through the peritoneum, and was not more than 3 or 4 mm. in length, and just large enough to receive the ureter snugly.

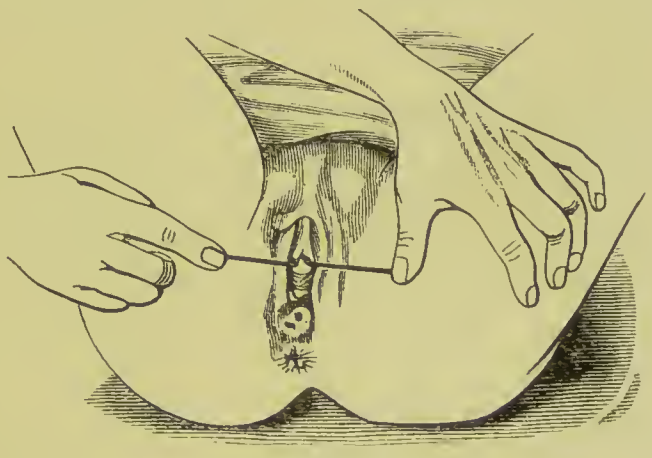


FIG. 516.—Hard-rubber Bougies introduced into both Ureters previous to Hysterectomy for Carcinoma.

'I then slit up the under surface of the ureter for about 4 mm., enlarging the calibre of its orifice to avoid a stricture, and with a pair of long delicate forceps introduced through the urethra, the bladder, and through the incision, I caught the ureteral end and drew it into the bladder and held it there while it was being attached to the bladder wall by about six fine interrupted silk sutures passed through the muscular tissue of the bladder and peritoneal and muscular coats of the ureter on all sides, beginning with the under side.

'The ureter thus dissected out of its bed, and attached to the bladder, was stretched like a lax cord from the posterior

part of the pelvis to the bladder, which lay gibbous and flattened out on the pelvic floor.

'The abdominal incision was closed down to its lower angle, where a narrow gauze drain was inserted for fear of leakage. Care was taken in closing the incision not to draw together the peritoneum underlying its lower end, to avoid raising the bladder and indirectly pulling upon the ureter.

'No leakage occurred, and the drain was removed, and the wound healed without suppuration. Her urinary difficulties were immediately and completely relieved with the perfect restoration of continence.'

Uretero-ureterostomy.

The ureter may be implanted into the bladder or the rectum. Rectal implantation has the objection that an infective nephritis is apt to follow in its train. Full particulars of all operative procedures on the ureter for wounds and fistulæ may be found in the communication of Fenger of Chicago (*Ann. Surg.*, September, 1894). Nephrectomy has many times been performed for severe wounds of the ureter when the accident has happened during hysterectomy. Uretero-ureterostomy is Van Hook's method of invagination (*Jour. Amer. Med. Ass.*, March 4, 1893). Briefly, the operation is resolved into the following steps: Ligation of the lower portion of the tube one-eighth or one-fourth of an inch from the free end with silk or catgut; one-fourth of an inch below the ligature, a longitudinal incision, twice the length of the ureteral diameter, is made in its wall. The upper portion of the ureter is now incised from its open end for one-fourth of an inch. With two fine cambric needles a loop of sterilized catgut is carried through this end of the ureter, one-eighth of an inch from the extremity, from within out. This loop firmly grasps the ureter. The apertures through which the loop passes are one-sixteenth to one-eighth of an inch apart, and equi-distant from the end of the duct. The two needles now lie free, and are

carried through the slit in the side of the lower end of the ureter, passing through the duct-wall for half an inch side by side, and by traction of the loop the upper end of the duct

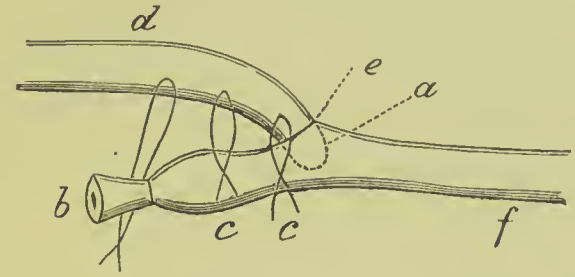


FIG. 517.—Uretero-ureteral Anastomosis (Bloodgood). *a*, Traction suture tied; *b*, ligated end of lower portion; *c c*, fixation sutures; *e*, lower end of upper segment implanted in slit in lower.

is drawn into the lower portion; and thus, when the ends of the loop are tied securely, the transplantation is effected by the passage of interrupted extra-mucous sutures which complete the union; finally, the operation being intra-peritoneal, the ureter is enveloped in peritoneum.

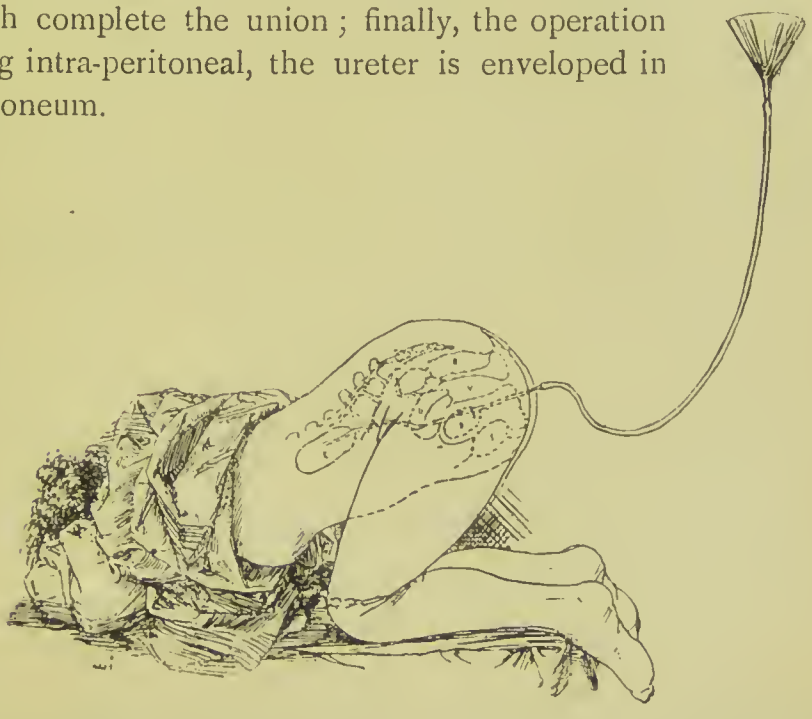


FIG. 517*a*.—Irrigation of the ureter in a case of pyo-urcteritis. By changing the position of the body from the genupectoral to the horizontal, the antiseptic (boric) solution flowed in and out (Howard Kelly).

CHAPTER XLIV.

THE KIDNEY.

A FEW OBSERVATIONS ON DISEASES OF THE KIDNEY IN WOMEN.

I HAVE already repeatedly urged the possibility of committing an error in overlooking a renal affection, whether in the form of fluid accumulation or solid growth, when making an abdominal examination. There are many practical points of the greatest importance, bearing on the special relation of renal disease to affections of the pelvic organs in women, that it is absolutely necessary to refer to in a gynæcological text-book. This remark applies more particularly to renal enlargements due to neoplastic formations, cystic growths, distension with water or pus, or from malignant disease.

In the works of Henry Morris and Greig Smith, the student or surgeon will find the most complete information on the pathology, symptomatology, and surgery of the kidney. That knowledge has been of late years enormously advanced through the original and brilliant work of such men as Howard Kelly and Christian Fenger in America. And to the writings of the latter surgeons (*Bulletins of John Hopkins Hospital* and the *Annals of Surgery*) all should refer who desire to have accurate information with regard to the operative procedures of our distinguished American *confrères*.

Differentiation and Diagnosis of Renal Enlargement.

Rather with the view of emphasizing the necessity for knowledge of the sources of error arising from forgetfulness of the care required in differentiating certain affections of the kidney from disorders of the pelvic viscera, than of entering

into a detailed description of the former, are these observations made.

Landmarks of the Renal Region.

In examination of the kidney by palpation, we have to remember the different relations of the right and left viscus. We may accept as sufficiently accurate for defining the position of the kidney, the lower border of the eleventh rib, and the middle of the third lumbar spine, the situation of the hilum being marked by the level of the first lumbar vertebra. While the right kidney is in close relation to the under surface of the liver above, it has the duodenum and hepatic flexure of the colon lying in front of it, the duodenum 'almost invariably resting upon its anterior surface;' the superior border of the left organ touches the fundus of the stomach, and for its upper two-thirds its outer border is in relation with the spleen. Anteriorly, and along its inner border, is the pancreas, the descending colon lying over its anterior surface below. Such connections show how difficult it is always to isolate the kidney when there are morbid conditions, displacements, or enlargements of the surrounding viscera, and its comparative immobility, as pointed out by Cunningham and Kendal Franks, while due partly to its shape, is also dependent upon the indirect pressure exercised on its surface by these viscera.* The mobility of the kidney is influenced by the amount of fatty tissue by which it is enveloped. The posterior surface of the kidney, says Franks, exhibits three well-marked areas, which correspond respectively to the psoas internally, to the quadratus lumborum externally, and to the diaphragm above.

I have thus briefly recalled the positions and surroundings of the kidneys, in order that the reader may bear these well in mind in making a manual examination of the organ. It must, however, be remembered that in a large proportion of cases the kidney cannot be felt below the margin of the ribs. Noble states that in three-fourths of the

* *Jour. Anat and Phys.*, July, 1895; *Brit. Med. Jour.*, October 12, 1895.

cases examined by him the kidney could not be palpated. This, however, may, as he says, depend upon the difficulty of detection of the lower margin of the kidney in a clinical examination. Another practical point to remember is that the kidney moves slightly in inspiration, descending with the descent of the diaphragm.

Examination of the Kidney by Palpation.

The kidney may be palpated with the patient in three different positions — in the dorsal position, with the head and trunk well raised; in the prone, bending forwards over the end of a couch; or standing. In cases of doubt and difficulty it is well to examine in all three positions. If in the dorsal position, one hand is carried under the renal region, and the other is placed over it in front on the abdomen. By deep pressure and movement of the fingers any enlargement or tenderness may be detected. This is further facilitated by making the patient turn a little towards either side. While she is lying on her back, it is advisable to carry a hand behind each kidney, and, by simultaneous and alternate pressure, relatively gauge any difference in size which may exist.

In the second position, the patient leans forward over the end of a fairly high couch, the waist being supported by a firm pillow. The renal region of both sides is bimanually palpated. In the third position, the patient, who is standing, leans slightly forward, with the hands resting on a table, and the lumbar regions are then examined as in the other methods. The principal swellings at the right side, which have to be borne in mind as likely to be mistaken for enlargements of the kidney, are a duodenal tumour, a distended gall-bladder, an omental tumour, disease in the hepatic flexure of the colon, impacted fæces, and a pyloric growth; at the left side, splenic enlargement, an omental tumour, or disease of the descending colon.

Aspiration of the Kidney.

Puncture of the Kidney.—'An abundant experience of this very simple operation,' says Greig Smith, 'proves that it is too frequently allied to the experiment of introducing a germ-laden needle into the midst of a cultivation jelly.' Thus he accentuates the care which ought to be taken to asepticize the needle-point and fill the puncturing-needle of the aspirator with some antiseptic fluid in making the puncture. In gynæcological practice—to which alone I refer—this step is undertaken both as a means of diagnosis and as a therapeutic measure, in order to draw off the fluid. Morris recommends as the point of entrance of the needle *on the left side*, '*just anterior to the last intercostal space*;' *and on the right side*, '*a point half-way between the last rib and the crest of the ilium, from two to two and a half inches behind the anterior superior spine of the ilium.*'

Though a needle passed horizontally inwards at this spot is 'altogether in front of the normal kidney, and will either transfix or pass in front of the ascending colon when in its usual place,' Morris points out that in enlargement of the kidney of the right side, in cases of hydro-nephrosis of the right side, if the needle be directed somewhat forwards, both peritoneum and colon will escape, and the pelvis of the kidney will be tapped at its anterior and lower aspect.

The needle is directed sufficiently forwards to escape the kidney, but not so far as to endanger the colon and peritoneum. The greatest care must be taken when the fluid is escaping, and the cavity is nearly empty, not to push the needle further in, so as to avoid the risk of wounding either the renal vessels or the peritoneum.

This operation, we must remember, is both curative and diagnostic. Its performance will often save the necessity for a nephrotomy, or possibly a nephrectomy, and is always indicated in the case of *simple cysts*, *hydro-nephrosis*, and *hydatid cysts*.*

* See Greig Smith's 'Abdominal Surgery,' 5th ed., vol. ii.

*Causes of Renal Enlargement.**

It is well in the first place to enumerate the principal sources of pelvic enlargement.

Fluid Enlargements—

Hydro-nephrosis.
Pyo-nephrosis.
Renal abscess.
Peri-nephric abscess.
Suppurative nephritis.
Scrofulous kidney.
Simple cysts.
Hydatid cysts.

Any of these conditions may be complicated with calculus in the kidney or ureter.

Simple Neoplasms—

Fibromata ... Inflammatory; Simple; Cystic;
Lipomata ... Muscular; Fatty.

Hæmatangiomata.
Osteomata.
Adenomata ... Papillary; Glandular.

Malignant Neoplasms—

Sarcomata (various kinds).
Lymph adenomata.
Carcinomata (various kinds).

Hydro-Nephrosis (congenital or acquired)—

Is a distension of the kidney with fluid caused by obstruction to the flow of urine. (Liable to be confounded with ovarian cystoma).

* See Knowsley Thornton's 'Harveian Lectures,' 1889.

Pyo-Nephrosis—

Hydro-nephrosis, accompanied by suppuration. (Very liable to follow calculus or traumatic puncture of the hydro-nephrotic cyst; it may cause cystitis.)

Renal Abscess—

Generally the result of injury, calculus, or foreign body; or it may follow the administration of cantharides or turpentine.

Peri-Nephric Abscess—

Abscess in the cellular bed outside the kidney. (*a*) Primary and independent of the kidney; (*b*) secondary to suppurative nephritis, renal abscess, or pyo-nephrosis; (*c*) secondary to renal fistula and urinary extravasation and calculus.

Suppurative Nephritis—

Suppurative inflammation of the kidney, either of its pelvis (pyelitis) or of the entire organ (pyelo-nephritis). It is usually a secondary and acute inflammation, attacking both kidneys, and rapidly fatal.

Scrofulous Kidney—

Tuberculous degeneration of the kidney—generally both organs—ending frequently in abscesses (pyelitis or nephritis). The ureter and bladder are often involved.

Simple Cysts—

Spring from the cortex; contents vary in character; serous, albuminous, or of a colloid nature; do not contain urine.

Hydatid Cysts—

Generally originate in the renal tissue; occasionally from the subcapsular cellular tissue. May assume large size, and be mistaken for ovarian cystoma.

Fibroma—

A renal fibroma may assume an enormous size. Bilroth removed one weighing 40 lb., and Sir Spencer Wells two fibro-lipomata weighing $16\frac{1}{2}$ lb. and $14\frac{1}{2}$ lb. respectively. They may degenerate into fibro-cysto-mata or fibro-lipomata.

Lipoma—

Originates in the adipose areolar tissue, and forces its way into the hilum of the kidney.

Hæmatangioma and Osteoma—

Very rare.

Adenoma—

(*a*) Papillary — more common as originating in the tubules and Malpighian capsules; (*b*) Glandular—are more frequent in the cortex. (Knowsley Thornton describes a kidney which was affected with calculus and papilloma of the pelvic end of the ureters, causing hydro-nephrosis.)

Sarcoma—

The same author, in accounting for the recurrence (after removal) and malignancy of sarcoma of the kidney in children, and its non-malignancy in the adult, says: 'The difference is to be sought in the varieties of sarcoma most common in early life, and in the adult; and, secondly, in the portion of the organ first invaded by the disease.' In children he notices the prevalence of the cell element approaching the embryonic type; the intercellular substance is soft and full of fluid. In the adult there is less of the cellular and much more abundant intercellular tissue, which is dense and hard, and of slower growth, the capsule alone being commonly attacked, while in children the entire renal substance is infiltrated.

Lymphadenoma—

Is accompanied by evidence of the disease elsewhere.

Carcinoma—

Encephaloid is the form most frequently met with; next, scirrhus; and, lastly, colloid.

I have thus summarized the different enlargements of the kidney in order to press on the reader the necessity of being on his guard in arriving at a diagnosis in some cases of obscure abdominal tumour, and even in cases in which the nature of

the disease seems at first sight obvious. Remembering that hepatic and renal tumours may both complicate and simulate ovarian-uterine tumours, he must not forget so to investigate all suspicious cases, as to eliminate those sources of error that might perhaps lead up to a useless or fatal laparotomy. In the instance of the liver, the evidences of hepatic disease (*vide* chapter on 'Ovarian Tumours') are to be sought for in the area, site, and connections of the tumour; icterus; emaciation; sickness; constipation; and ascites. In the case of the kidney, we must, in addition to the local and constitutional evidences of renal disorder, most carefully examine the urine for the presence of albumen, pus, mucus, or débris of renal tubes and epithelium.

In dealing with the conditions most nearly touching the province of the gynæcologist, Knowsley Thornton, in his 'Harveian Lectures,' thus speaks of hydro-nephrosis and renal tumours:

Hydro-Nephrosis: Differentiation from Ovarian Cystoma.

'This is not always easy; retro-peritoneal, omental, and mesenteric cysts are especially difficult to differentiate from hydro-nephrosis, and it has been a common error to mistake an ovarian cyst for hydro-nephrosis, or *vice-versâ*. It is also in some cases difficult to distinguish between hydro- and pyo-nephrosis. The position of the colon, curving across the tumour, is one of the best diagnostic points in renal tumours, giving a clear note on percussion over their inner border. Sometimes this is lost through the intestine being contracted and empty, but even then it can often be defined as a raised cord, which varies in shape under pressure. In very large tumours the bowel sometimes gets behind, and this sign is altogether lost. I have seen some retro-peritoneal cysts which it was quite impossible to distinguish from hydro-nephrosis till the abdomen was opened, and in one case I did not discover what the tumour was till I had enucleated a considerable portion of it, so exactly did it simulate a distended adherent kidney. There should, however, be no difficulty in differentiating a hydro-nephrosis from an ovarian cyst, and yet they are frequently mistaken for one another. In the former there is the position of the colon, the dulness going far back into the loin and under the ribs, and nearly always a clear line between the lower edge of the tumour and the iliac crest. In the ovarian cyst the dulness and fluctuation rarely go so high and so far back, and though its upper margin is often overlaid by clear intestine, there is not the same fixed curve of clear note, and the dulness extends down to the iliac crest and pubes. The ovarian cyst has usually more lateral mobility than the renal cyst. The pelvic examination alone will usually distinguish the one disease from the other. The hydro-nephrosis rarely becomes pelvic; the ovarian tumour is nearly always more or less so. If the lower part of the hydro-nephrosis should enter the

pelvis, its close connection with the bladder can be traced, while pressing up its abdominal portion does not affect the uterus, the exact reverse being the case for the ovarian cyst. Careful aseptic puncture far back in the loin and examination of the fluid removed are, however, the only certain means of diagnosis —at any rate, in many of the cases.'

Renal Tumours—Diagnosis.

'The tumours most kely to be mistaken for renal tumours are: (1) *Retro-peritoneal cysts;* often quite impossible to diagnose from hydro-nephrosis, (2) *Omental cysts;* easier on account of the different relations of the bowel. On the right side (3) *Distended gall-bladder*, when surrounded by adhesions, quite impossible to differentiate in some cases from renal tumour; when free and mobile, its exact relations are easier to define. (4) *Enlargement of the spleen;* this ought not to be mistaken for renal tumour; first, there is the notch, always to be found with careful search; then there is the hard, sharp border, quite different from any renal tumour; then the percussion is dull to the very edge of the tumour; the intestine never overlaps unless it is adherent, which is very rare. (5) *Ovarian tumour;* I have already pointed out the differences under hydro-nephrosis. I can imagine that a *sub-peritoneal fibro-myoma* uteri might be very difficult to differentiate from a renal tumour, when the latter was large enough to dip into the pelvis, but I have not seen such a case. I have operated upon solid sarcomata of the mesentery and retro-peritoneal cellular tissue, which it was quite impossible to distinguish from renal sarcoma till the abdomen was opened.'

Temporary Disappearance of the Renal Swelling.—There is one point of importance in regard to certain enlargements o the kidney not to be forgotten, and which may both puzzle the practitioner and reflect unpleasantly on his opinion, viz., *the chance of a temporary subsidence or disappearance of the tumour.* This may happen in the case of hydro-nephrosis or pyo-nephrosis, when the fluid, which has been imprisoned by some obstruction—as, for instance, a calculus in the ureter—passes into the bladder through removal of the impediment, and a previously blocked ureter becomes pervious; or it may occur in the instance of a movable kidney, the shifting or displacement of which may depend on posture or occupation.

Movable or Displaced Kidney—*Etiology.*—The only affection of the kidney that I propose to deal with in any detail is that of movable kidney.

A distinction has been drawn (Jenner) between 'movable' kidney and 'floating' kidney, the latter term being applied to

that form of displacement in which there is a meso-nephron or fold of peritoneum attaching it to the vertebral column. This is by far the rarer variety of displacement. It is at times a congenital malformation. Displaced kidney may follow from shock, falls, blows, or other injury.

The inexperienced practitioner may be excused for overlooking an affection the symptoms of which, in the milder forms of displacement, are often obscure. The fact, however, that movable or floating kidney is found much more frequently in women than in men (in the proportion of seven to one), and that it is still commoner in those women who have borne children than in the unmarried, in consequence, probably, of the greater laxity of the abdominal wall in the former class, invests this renal affection with special interest in the eyes of the gynæcologist. Any prolonged or exhaustive drain on the system, which weakens the abdominal parietes and causes absorption of the circumrenal fat, is apt to predispose to loosening of the kidney.

For example, I have found movable kidney in women who have suffered from exhaustive discharges, such as severe hæmorrhage, from hæmorrhoids, after pregnancy, and in cases of malignant disease. 'With one exception,' says Noble, 'all the patients having a movable kidney that I have seen have been thin.'

Renal displacement is seldom found in very young patients, and the right kidney is generally the one most frequently found mobile. 'Women,' says Greig Smith, 'with long flexible spines and sloping lower ribs, which do not rise well forwards, but lie closely over or in contact with the kidney, provide the most abundant examples of this condition.' Hypertrophy of the kidney, or other tumour, may be the cause of the wandering or mobile kidney. A patient who suffered for some years from a pyo-nephritis consulted me. I found the left kidney so reduced in size that it was impossible to prove its presence. The right kidney was greatly hypertrophied, and freely movable.

Diagnosis.—I have already fully described the method of examining for a movable or displaced kidney. We have to

differentiate displaced kidney from a tumour of the pancreas, liver, gall-bladder, pylorus, and omentum, or a fæcal tumour of the colon. But what is of still greater importance for the gynæcologist to recollect is, that movable kidney, especially when enlarged, has been mistaken for ovarian cystoma, extra-ovarian cysts, hydro-salpinx, and pyo-salpinx. In any case of doubt, therefore, careful examination of the abdominal and pelvic viscera should be made before a conclusion is arrived at. The tumour gives a characteristic mobile sensation to the hands, and manipulation is generally attended with pain to the patient, and this often lasts for some time after the examination is over.

Morris has pointed out that in women with lax parietes and general looseness of the abdominal organs, or in those in whom the parietes are very resisting, a distended gall-bladder may easily be mistaken for a mobile kidney. The two conditions may also co-exist. Greig Smith, referring to the oblique direction of the growth of the gall-bladder tumour, points out that the tumour has grown before we have seen it, and is 'too small to have any definite direction.'

The superficial position of the gall-bladder will not help us if the intestines, in palpation, rise above it, and in the case of a very mobile kidney, in a thin woman, the kidney appears to be directly under the hand when she is turned on her side. However, it may be safely said that such cases of difficult diagnosis are very rare, and that the detection of a movable kidney, in the great majority of cases, is comparatively easy. In such exceptional cases, only by careful percussion and palpation in different positions is a decision to be arrived at. Other sources of error must be avoided by attention to the particular symptoms likely to accompany them. The gastric disturbances will warn us not to overlook the possibility of a pyloric growth, which, as Greig Smith points out, glides from under the palpating fingers directly upwards, and not upwards and backwards, as in the case of the kidney. The situation, however, of the pyloric tumour, and its fixed position, are quite distinctive features in this case. The sensations of faintness and sickness frequently complained of in handling a floating kidney are also helps in arriving at a conclusion.

Symptomatology.—Both the signs and symptoms of renal displacement will depend upon its degree, and whether one or both organs are mobile. Those attending slight displacement are frequently so mild in character that they may not arouse the suspicion of the surgeon as to the real cause of the temporary pain or distress, which is only periodically complained of. I have recently seen a patient with a movable kidney on either side. The right one is much the larger and more freely movable. The discovery was made accidentally in an abdominal examination for other symptoms. In several cases the patients had no suspicion of any abdominal tumour, simply consulting me for aggravated dyspepsia and gastrodynia and other reflex pains. It is well, therefore, when a woman complains of a constant or recurring pain in the lumbar region, which occasionally shoots up the side or down to the groin, and is increased by exercise, to carefully explore the lumbar regions.

There may be occasional attacks of syncope caused by pain, which varies with the degree of mobility and the size of the kidney. After a time the organ may be, and frequently is, enlarged. Hydro-nephrosis or pyo-nephrosis may be present. Such an enlarged, hydro-nephrotic, movable kidney I have been recently consulted for in a middle-aged woman. The tumour then may fill the space between the crest of the ilium and the last rib, and much of the previous mobility may disappear. In cases in which this displacement has lasted for some time the general health suffers more or less. There is frequently sickness or nausea. The patient becomes nervous, and loses flesh more rapidly; the pain is more constant, constipation is frequently present, as are the other natural results of want of exercise and loss of appetite.

Treatment.—Outside the general indications for the constitutional conditions that complicate a mobile kidney, the special treatment resolves itself into the use of a well-made support or the operation of nephrorraphy. The operation of nephrectomy is not by any surgeon to be named in discussing simple, uncomplicated movable kidney. I have two patients at the present

moment who are fairly comfortable, though both kidneys are mobile, who go about their household and other duties wearing a kidney-belt with double supports. The form I prefer is that shown at p. 816. A light leather plate is incorporated with the web lining; this is well padded, or can be covered with an air-pad. The plate is sufficiently large to cover comfortably the renal region. In the front of the belt is another air-pad, with a stop-cock attached, so that it can be increased or diminished in size at pleasure. I find this double support, behind and in front, far preferable to the belt ordinarily sold, with the pad only behind. I also think that the curved plate of steel, about the width of the palm of the hand, is more resisting and efficient than the air-pad posteriorly. Should such support fail to give relief, and the patient be willing to undergo nephrorraphy, the operation may be performed. The steps of this operation are briefly the following:

Nephrorraphy.

The patient having been laid in the proper position, an oblique incision to expose the kidney is carried from the outer border of the erector spinæ, half an inch below the last rib, towards the crest of the ileum, for the extent of three inches; the length of the incision must, however, depend upon circumstances. This incision divides the skin, fat, and fascia, and exposes the outer edge of the latissimus dorsi and the posterior border of the external oblique. The deeper part of this incision should correspond in extent with the skin wound. When the aponeurosis of the internal oblique and transversalis has been sufficiently divided, the quadratus lumborum muscle is exposed and retracted, and, lastly, the lumbar fascia is cut to the extent of the entire wound. Forcipressure is used for the control of bleeding vessels. The perirenal fat and fascia having been well exposed by retractors, the fat, save in rare cases, when it is closely adherent to the capsule of the kidney, is opened, and the viscus is exposed. The aseptic finger is then freely used to determine the degree of mobility, and to excite plastic

adhesions. The next step consists in thoroughly freeing the kidney of its fatty tissue, so as to get the kidney to lie on the muscular structure. The capsule is now scratched with a blunt needle or the finger-nail. The kidney, thus completely freed, is drawn into the abdominal wound. Buried sutures are passed, two or three in number, with a blunt-pointed needle, through the substance of the kidney, an inch from its free margin, a drainage-tube is inserted, and the wound closed. The entire operation, from first to last, is aseptically conducted.

Renal Calculus.

An interesting case of renal calculus has been recorded by Spanton, of Hanley. The symptoms were fairly characteristic of stone in the kidney, leading

FIG. 518.—Phosphatic Calculus removed from Right Kidney. Weight 980 grains. Exact size. (Spanton.)

up to pyo-nephritis. The patient, who had had eight children, 'twelve months ago first felt pain, but thought it was indigestion. Two years since she over-

walked herself, and on returning passed urine of a dark purplish colour, but the urine was natural afterwards.

'About two months since first noticed small swelling in right iliac region; this caused more pain than patient remembered having before, but even this was not severe; no pain on micturition. Passed urine about eight times in twenty-four hours. Urine, patient thought, had a thick sediment in it for the

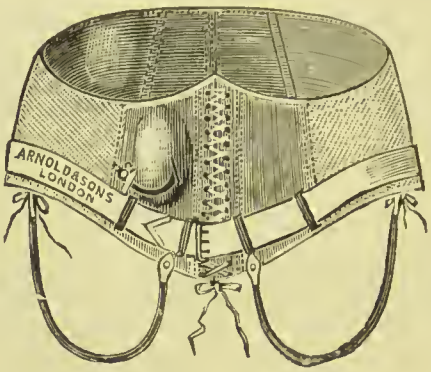


FIG. 519.—Author's Belt for Movable Kidney, with indiarubber inflating pad, leather convex back pad, and indiarubber under-straps.

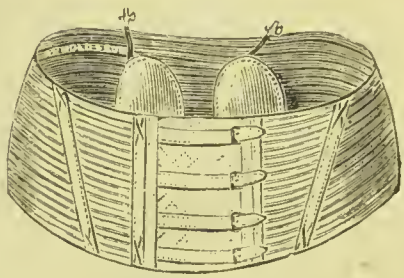


FIG. 520.—Double Air-pad Belt for Movable Kidney.

past twelve months. Specific gravity 1025, containing much pus, about 20 ounces in twenty-four hours.'

During operation several ounces of fœtid pus and urine were drawn from the kidney. The patient was operated upon twice before the entire calculus could be removed.

An interesting feature of the case was the comparatively slight local trouble present, nor was there any history of renal colic. There was, however, considerable wasting, with great weakness. The patient made a complete recovery.

CHAPTER XLV.

SOME AFFECTIONS OF THE RECTUM.

The affections of the rectum in women which the practitioner is called on to diagnose and treat are:

- Proctitis.
- Gonorrhœal proctitis.
- Impaction of fæces.
- Fistula.
- Abscess.
- Hæmorrhoids, external.
- ,, internal.
- Simple ulceration.
- Fissure.
- Stricture.
- Malignant disease:
  - Epithelioma.
  - Scirrhus.
  - Encephaloid.
- Malignant disease (*continued*):
  - Colloid.
  - Melanosis.
- Syphilitic disease:
  - Various cutaneous affections of the anus.
  - Ulceration.
  - Stricture.
- Pruritus ani.
- Foreign bodies in the rectum.
- Procidentia.
- Polypus.
- Rodent ulcer.

I cannot deal exhaustively, in a manual of this nature, with the treatment of the various diseases of the rectum I have enumerated.*

A few general observations, however, regarding those affections which we have most frequently to treat in women, I think it desirable to make. Though some of these are not specially applicable to women, still, they are all of such importance that

* See remarks on the rectum in the opening chapter.

I cannot refrain from insisting here on the necessity for observing the rules and precautions included in this brief chapter.

Examination.—To examine the patient for rectal disease, place her on her right side, with the knees well drawn up. Previously have an enema administered. In cases where there is excessive sensitiveness, or where a thorough exploration is required to diagnose the presence and extent of malignant disease, painful ulcer or fissure, an anæsthetic should be given. The necessity is clear to examine the rectum if there be—

A sense of fulness and pain in the neighbourhood of the anus.
Pain on defæcation.
Prolapse of the bowel.
Hæmorrhage.
Discharge of any kind.

Without an anæsthetic, after an enema is administered, the patient can be made to expose the bowel by bearing down, and thus the practitioner can touch with the finger a higher spot in the bowel. *He must trust to the education of the finger in examinations of the rectum rather than to the assistance gained from any speculum.* He should learn to recognise by touch *the uneven and roughened feeling of ulceration, the characteristic hardness of malignant disease, the smooth but tense feeling of hæmorrhoids, the contraction the result of stricture, the chink of a fissure, the pediculated attachment of a polypus, and the internal aperture of a fistula.* Above all, he must not be misled by the common statement of a patient that she suffers from 'bleeding piles,' and be satisfied with her assurance on this point, even though she tells him that she has been under treatment for piles. It has fallen to my lot to see patients who never suspected there was anything more serious than a hæmorrhoidal state of the bowel, yet, on examination, advanced malignant disease has been discovered, or more frequently a fissure or ulcer. In all cases where doubt exists, and the patient resists examination, an anæsthetic should be given. The dilatation

of the sphincter is easily effected under anæsthesia; and when this is done, as it should be, slowly and without force, we can,

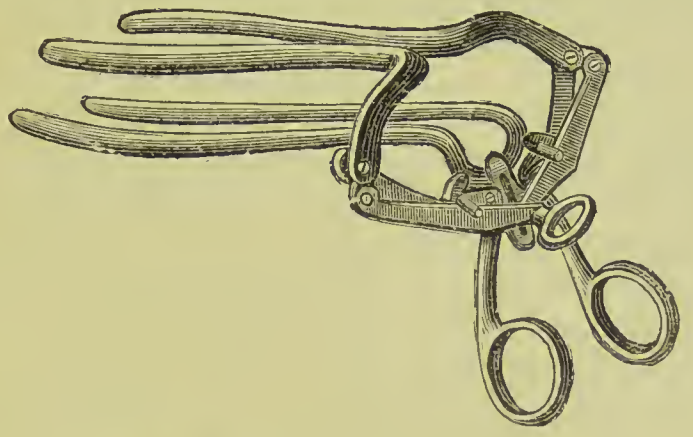


FIG. 521.—Four-bladed Rectal Speculum.

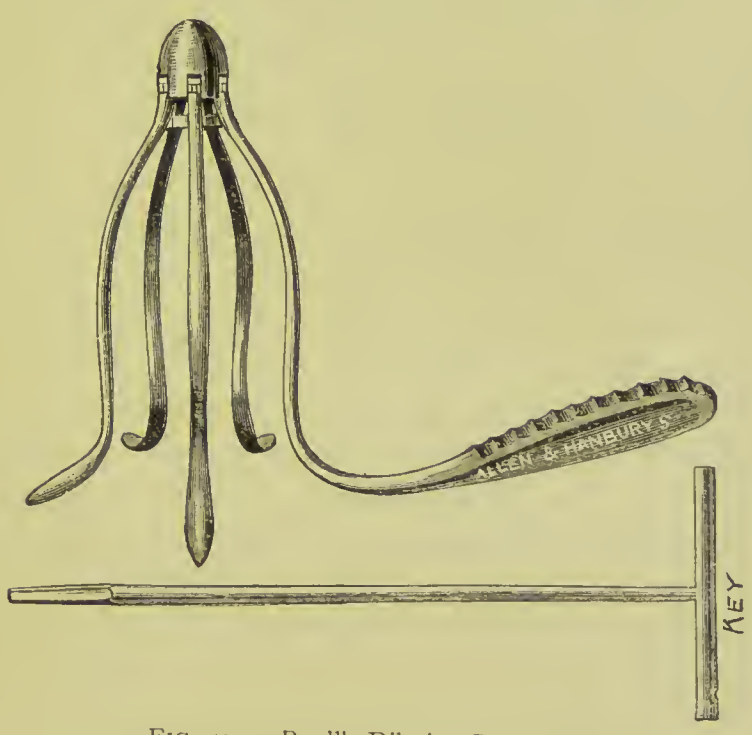


FIG. 522.—Ryall's Dilating Speculum.*

with a suitable speculum or retractors, completely explore the rectum. Simon's method of examination has already been referred to.

* This is a most ingenious speculum. The key is used with the screw for dilating the blades.

Eversion of the rectum in multiparæ may be secured by pressing on the tube, with the fingers carried into the vagina (Storer).

Proctitis.

Causation and Symptoms.—Inflammation of the rectum is attended by the usual symptoms of pain, smarting, heat, throbbing sensation, and some swelling of the anus. In women the cause of the inflammation may be due to the contact of infective discharges from the vagina. It may supervene upon the attack of a zymotic fever, or may be brought about by the presence of any foreign body in the bowel. In gouty states of the system, when constipation is present, any exciting cause may bring about an attack which may lead to abscess and fistula. We have already referred to the spread of gonorrhœal infection from the vagina to the rectum.

Fritsch, in explanation of the obstinate nature of gonorrhœal proctitis, refers to the persistence in the discharge of the gonococcus, and he thinks that many of the supposed specific ulcers of the rectum are really due to gonorrhœal virus, the cocci being found six months after the original attack.

Treatment.—When such symptoms are present, a few leeches applied round the anus, warm fomentations, hot sponging with solution of hazeline and laudanum, eucaine or cocaine suppositories, warm boric injections of hot water with laudanum, and rest in bed, will afford relief. Should the infection be due to gonorrhœa, disinfectant lotions of mercuric perchloride (one-sixteenth of a grain to the ounce), or of permanganate of potash, and injections of boric acid into the bowel, should be used, and perfect cleanliness enforced. The rectum must always be gently but carefully explored. Such local treatment is combined with the administration of gentle laxatives, such as some of those recommended under the head of aperients.

Impaction of Fæces and Fæcal Tumours.

Experience has taught me how extremely careful we must be, in cases in which obscure abdominal symptoms are present, not to overlook the possibility of a fæcal accumulation in some portion of the intestine. *I have known a fæcal tumour mistaken, through the signs and symptoms it caused, for ascites, malignant tumour, ovarian dropsy, and aneurysmal enlargements of the abdominal aorta.* Many times I have seen fæcal accumulations in the rectum, the result of habitual neglect of the bowel in women, aggravate, if they have not brought about, various forms of uterine disorder. And it is always well for the practitioner to be on his guard, and to recollect that *the presence of a fæcal accumulation in the bowel is quite consistent with semi-liquid motions and a certain degree of response to laxative or aperient medicines.*

When there are symptoms of obstruction, and on examination the rectum is found blocked with a hard mass of fæces, the bowel should be emptied by the finger or scoop under an anæsthetic. The amount of fæcal matter that may come away in these cases is astonishing, nor does the previous passage of semi-fluid matter with aperients negative such a result. A fæcal concretion may exist anywhere in the colon, and either at the side of it, or possibly by tunnelling the mass, this semi-solid evacuation may escape. In such cases I dilate the sphincters thoroughly under chloroform, and remove the masses with my hand. A patient was suffering from fissure, and had encouraged the accumulation of an enormous mass of hard fæces rather than permit the bowel to move. Under chloroform I dilated the sphincters, removing the masses with my hand, using, as I always have done in such cases, a large enema of almond oil and thin gruel immediately afterwards. In another most interesting and obscure case of suspected abdominal tumour, I emptied the bowel in the same manner, and the patient was permanently relieved. The student or practitioner can draw his own conclusions from the outline

of such cases. I have removed from the rectum of female patients foreign bodies which have caused obscure symptoms; in one case a fish-bone, and in the other a portion of wood, was the offending tenant. The possibility of this cause of rectal or ischio-rectal abscess should not be overlooked.

Thorough dilatation of the sphincters under anæsthesia I have already alluded to as a preliminary step in the treatment of obstinate and chronic costiveness.

Fistula.

Causation.—Injuries, foreign bodies, zymotic fevers, hæmorrhoids, syphilis, tubercle. They may be intra or extra-rectal

FIG. 523.—Rectal Probe and Protector.

in their origin, the primary abscess or ulceration commencing in the mucous membrane, in the submucous tissue, in the subcutaneous cellular tissue about the anus, or more deeply in the ischio-rectal fossa.

Fistulæ are *complete*, opening into the bowel either above the internal sphincter or more commonly between it and the external; *blind external*, which *is* a blind external canal, as it has no internal aperture; and *blind internal*, which has no external opening. The direction of the sinus of the latter fistula may be suspected by the position of the external orifice; if this be posterior to the transverse axis of the anal opening, the fistulous aperture is in the middle line, while, if the external aperture is in front of the transverse axis, the sinus is straight, and the internal opening is directly opposite to the external (Goodsall).

In the case of *a horseshoe fistula* there are two apertures, usually dorsal and posterior to the anus, communicating with each other by a curved or crescentic canal.

Treatment of Abscess and Fistula.—Any abscess that forms in the region of the anus or perinæum should be opened early. Its extent can be previously ascertained by a recto-vaginal exploration. The swelling is made tense by pressure on it from the rectal side. It is then freely opened at a right angle to the anus with ordinary antiseptic precautions. Thorough healing should be secured by dressing the abscess cavity, when it has been thoroughly cleansed, with a carbolized solution, by passing into it a strip of iodoform gauze and getting the wound to heal from the bottom.

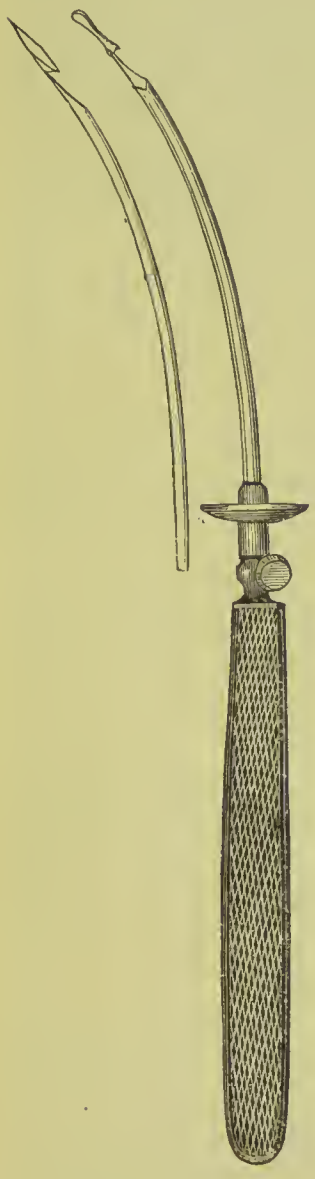


FIG. 524.—Ligature Tractor, for conveying the elastic ligature.

General Rules.

Abscess and Fistula.—1st. All abscesses about the region of the anus and perinæum should be opened early (with ordinary antiseptic precautions).

2nd. Be careful, in women, of too free division of the sphincter in operating for fistula; most unfortunate consequences from difficulty of retaining flatus or fæces may be the result.

3rd. Be rather over-cautious in operating for fistula when it complicates tubercular phthisis; but if the case be not far advanced, and strength be returning, the propriety of operating should be considered.

Fistula in Ano is best operated on by the knife. Dittel's method by means of elastic ligature for cutting through the fistula is seldom practised. Allingham has devised a simple and ingenious hook for drawing the ligature from the

bowel through the fistula (p. 823). The solid rubber ligature is caught in the notch and secured by pushing the cannula forwards. This is carried, guided by the finger, up the rectum, and the ligature thus directed through the sinus. The ends of the ligature are drawn tight, and secured by a soft metal button. The average time the ligature takes to cut through is six days. The asserted advantages are that we avoid the infliction of much pain, and the patient can move about. As regards fistula, I would broadly lay down these rules:

(1) Do not be tempted to temporize with a fistula, complete or incomplete; delay, in the large proportion of cases, only leads to more extensive burrowing, and renders the inevitable division of the fistula a more serious step.

(2) Remembering the caution already laid down with regard to women, be on the safe side, and divide a fistula thoroughly with the sphincter muscle.

(3) In operating we cannot make too careful a search for by-channels and burrowing sinuses in the track of the parent canal. Open these also freely.

(4) Make a blind internal fistula complete, and divide the sphincter.

(5) Dry wool, or wool with a little weak thymol ointment, is the best dressing after operation. Do not overdo dressing; it is apt to irritate and create discharge, or delay the healing process. A little Condy's or Chinosol solution will keep the part clean.

If the fistula should be of the 'horseshoe' kind, it must be opened in the manner advised by Mr. Swinford Edwards: 'Pass through the internal orifice a probe-pointed director, and on its point incise the skin in the middle line behind; now push the director through and slit up. Secondly, slit up the lateral sinuses on directors passed in at each external opening and brought out through the dorsal incision.' Thus a T-shaped incision results. Also, off-sinuses can be opened from the main track, and the sphincters are wounded as little as possible.

Other Methods of Treatment.

For my own part, I only believe, speaking generally, in the cure of a fistulous sinus by dividing it with the knife. Other means may be tried, and I have cured small fistulæ by means of the galvanic cautery. Free dilatation of the sphincters, followed by the application of carbolic acid or chloride of zinc to the fistulous canal, while the external orifice is kept open, may be tried. But all these processes are tedious, and eventually, as a rule, end in recourse to operation by the knife.

HÆMORRHOIDS.

Women are specially liable to hæmorrhoids. I will not delay here to enter into the question of the causation and structure of piles. It is sufficient to say that *external* hæmorrhoids, and the resulting tags of loose skin that fringe the anus, are receptacles for impure discharges, both rectal and vaginal, which dry in the chinks between the folds. This tends to cause rectal irritation, to lead to fissure and pruritus ani, or proctitis. *Internal* hæmorrhoids cause a wearing pain and distress in the sacral region, often extending to the thighs. They are frequently the source of mental depression and irritation. If they bleed, they deteriorate the general health, and in many cases I have known them, at the time of the climacteric, to lead to a serious degree of anæmia. The general treatment and ordinary therapeutic measures to be adopted in the case of piles I summarize under the head of 'General Therapeutic Hints,' p. 835.

Question of Operation during Pregnancy, and where there is an associated Uterine Affection.

Unless there be some good reason to the contrary, it is best *not* to operate on a pregnant woman for piles. But if the hæmorrhage be severe, then the piles should be removed, and the remote risk of a miscarriage occurring must be taken. It may be also looked upon as a safe rule, that where there is any

attendant uterine affection, such as a severe erosion, endometritis, or a displacement, it is better to first rectify the uterine error before proceeding to operate for the internal hæmorrhoids.

Allingham's remarks on the subject of operation for hæmorrhoids when there is a version of the uterus are so important that I quote them. 'In women suffering from a retroverted uterus, an operation for piles is very undesirable, and will most certainly end in disappointment, unless the uterine complication be attended to at the same time, or, what is better, prior to the operation.' If we can restore the uterus to its normal position and size, you will find that the rectal affection will soon become a comparatively small matter.

With regard to choice of operation for hæmorrhoids, I decidedly believe that the safest operation and most satisfactory is the ligature. For over twenty-five years I have never had occasion to regret operating by this method, both as regards the effectiveness of the cure and the freedom from hæmorrhage. In all the cases I have done I have never had a fatal issue, though this retrospect includes every conceivable degree of hæmorrhoidal condition and attendant prolapse. I am aware that the clamp is a cleaner, more rapid, and equally effective method (especially the clamp, see p. 831, used after the 'crushing' method of Pollock), but to the practitioner operating on women with relaxed tissues and large venous hæmorrhoids, and perhaps living at a distance from the operator, I would say, operate by the ligature. The strong non-absorbent silk is best, such as is used in the operation of ovariotomy. No matter how brilliant and pleasant be the results in the large proportion of cases with the clamp, or clamp and cautery, the surgeon may in some unexpected cases be caught, and find it difficult, if not impossible, to stop the hæmorrhage. '*I do not think*,' *says Allingham*, '*in the whole range of surgery there is any procedure worthy the name of "operation" which can show a greater amount of success or a smaller death-rate than the ligature of internal hæmorrhoids.*'

Of 4,013 cases of hæmorrhoids ligatured at St. Mark's Hospital, there were five cases of tetanus and one case of doubtful pyæmia. The death-rate from all causes in operation by ligature in the hospital during a period of over forty years was 1 in 670; four of the five cases of death from tetanus occurred during a year (1858) when tetanus was rife in London.

The occurrence of the menstrual period must be inquired into before operating. It is not prudent to operate on the rectum when menstruation is approaching; we should select the time between two periods.

Operations for Hæmorrhoids.

The appliances necessary for the ordinary minor operative measures required in affections of the rectum are:

A few specula.
Rectal probes and director.

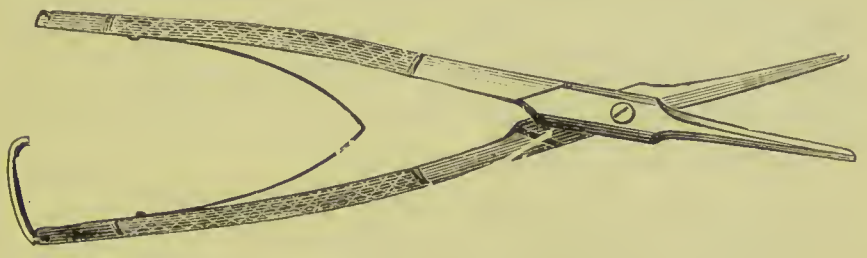


FIG. 525.—Straight (Spring) Pile Scissors.

Pile scissors, flat and curved.
,, forceps.
,, hook.
Straight spring scissors.
Blunt and probe-pointed bistouries.
Curved scissors.
Clamps.
Strong Chinese silk and gut ligature.
Pressure forceps.

Excision of External Hæmorrhoids.—This is best effected with the straight spring scissors (Fig. 525). The pile is simply snipped off. If there be loose tags of skin which fringe the anus, they are seized and cut off in the same way. The practitioner must be careful not to cut away too much integument, or remove several of these tags at the same sitting, lest serious contraction of the anal orifice result. If a woman be suffering severe pain from a congested and inflamed pile, it should be

incised. With the thumb and forefinger it is pinched up, steadied, and a curved bistoury is passed through it. The contained coagulum can often be squeezed out. Warm anodyne fomentations and soothing ointments can then be used. Chlorethyl spray is useful in making such an incision, or in cutting off the folds of skin.

To ligature Internal Piles.—Having regulated the patient's bowels for a few days previously, an enema is administered early on the morning of the operation, and immediately before it the rectum is washed out with a warm solution of boric acid. An anæsthetist, assistant, and nurse are required. The patient is brought well to the edge of the bed or table and placed opposite a good light, either in the semiprone or dorsal position, with a folded sheet and waterproof under the buttocks. When she is fully anæsthetized, dilate the sphincter well and thoroughly expose the piles. Cleanse the surface of the exposed bowel. A tampon of iodoform wool or a sponge may be carried some inches up the bowel to prevent any mucus or fæces descending during the operation. Decide the number of ligatures which it is necessary to apply. On a chair or small table at the side of the operator or assistant should be—

Some ready-cut ligatures.
Pile-scissors.
Curved and flat scissors.
Pressure forceps.
Pile-fork and pile-forceps.
A tenaculum.

The nurse has beside her a basin with some carbolized water, convenient-sized sponges, and sponge-holders.

Each pile (commencing with those nearest the anal aperture and on the lower rectal wall) is seized with the fork or pile-forceps, and drawn well down and out from the coat of the intestine. The pile-scissors (Fig. 527) bent on the flat, or the spring scissors, is now laid flat against the rectal tunic, and the blades are made to embrace the sides of the hæmorrhoid, the blunt points of the scissors not quite reaching to the summit

of the pile, and leaving its upper connection with the bowel free. With a few strokes of the scissors the division of the tumour is effected. The surgeon, laying down the scissors, transfers the pile-fork to his assistant, and, taking a ligature, carries it well in to the angle of the wound he has made, to the junction of the yet semi-detached pile with the rectal wall.

FIG. 526.—Pile Fork.

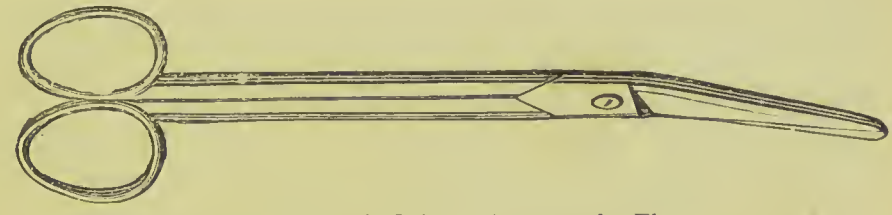


FIG. 527.—Pile Scissors bent on the Flat.

FIG. 528.—Catch Pile Forceps.

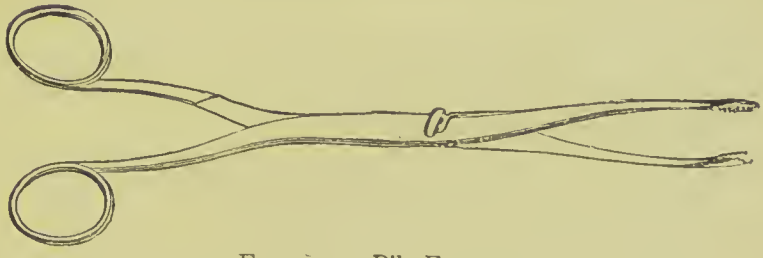


FIG. 529.—Pile Forceps.

He secures this ligature firmly with a double or triple knot, and cuts off one end close to the pile. The pile is now completely removed, not too close to the ligature, lest the latter be cut. He proceeds in this manner with each pile. Any spurting vessel he secures with a torsion forceps, or if necessary a carbolized catgut ligature. He next inspects the anus, and removes any superfluous folds of skin with the scissors. The

part should be sponged with some carbolic lotion, the buttocks are cleansed, a firm T-bandage is applied over the compress of thymol wool, an opiate is given, and the bowels should be kept quiet for at least five or six days after the operation. Then they are first moved by an emollient enema of strained gruel and olive-oil. The rectum may be daily douched with a warm boric acid lotion, and the finger, covered with some antiseptic ointment, is carried into the bowel gently, to lessen any chance of contraction. Ligatures generally come away on the seventh or eighth day. The patient remains in bed until the ligatures separate, and after this she may lie on a sofa for a few days before moving about. This she should not do too soon. Careful instructions should be given regarding the daily evacuation of the bowel, and the use of a little hazeline and boric acid injection after the motion is beneficial. Any swelling about the anus from the cutting off of external hæmorrhoids quickly subsides by attention to cleanliness and the use of an astringent ointment.

Clamp and Cautery.—After the remarks I have made on the 'clamp and cautery' method of removing piles, I do not intend to enter into the details of the operation. The preliminaries are the same as for operation by ligature; the pile is brought down, secured by the clamp, and then it is cut off with the bent scissors (Fig. 527), the cautery being applied at a dull heat.

The late Henry Smith, of King's College Hospital, was a strong advocate for the use of the clamp.

To Pollock we are indebted for the suggestion to remove piles by crushing (p. 831). The steps of the operation are as follows: The sphincters are first dilated. The pile is drawn into the clamp, and is crushed by tightly screwing up the bar of steel, and keeping it thus applied to the pile for the space of half a minute. The projecting portion of the pile is removed with scissors. There can be no doubt that crushing is, generally speaking, an expeditious, safe, and comparatively painless method of removing piles. Still, I maintain that we

are not safe, in a certain percentage of cases, from the risk of hæmorrhage, and I repeat that in the case of large hæmor-

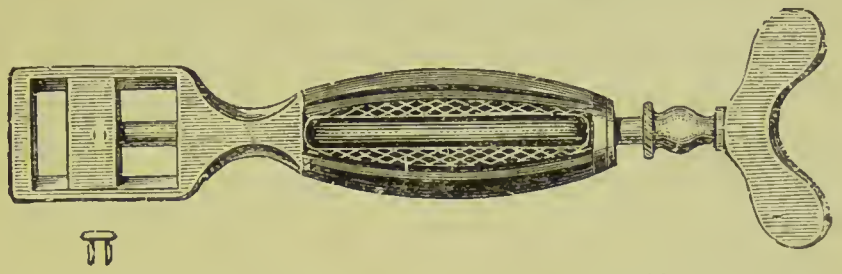


FIG. 530.—Clamp for crushing Hæmorrhoids.

rhoids, and when the patient lives at a distance, the practitioner and patient are safer with the ligature.*

To plug the Rectum for Hæmorrhage. — The following method of plugging the rectum, advised by Allingham, will be found by far the best: A good-sized conical-shaped sponge is secured by passing a piece of strong silk ligature through its apex. The sponge is then wetted and squeezed dry, and the interstices filled with alum or sulphate of iron. Guided by the fore-finger of the left hand, the conical end of the sponge is pushed well into the rectum for the extent of five inches, and the silk cord hangs from the anus. The space below the sponge is now filled with cotton-wool, on which is sprinkled more of the alum or sulphate of iron. The ends of the string hanging from the anus are now taken in the left hand, and traction is made on the sponge while the cotton-wool is pressed up against it with the finger of the other hand. The effect of the counter-pressure is to spread out 'umbrella shaped' the sponge, and to compress tightly the wool. This plug may remain in for a period of from eight to ten days. If a patient be troubled with wind, a flexible catheter or rectal tube may be introduced through the wool and sponge or at the side, and this prevents any troublesome flatulence. Opiates at the same time should be given.

* After the operation for hæmorrhoids, the bladder is prone to irritation, and some cystitis occasionally follows. The catheter should, if possible, be avoided, and the patient be encouraged to pass water. If the catheter be required, it must be gently used and perfectly aseptic.

Ulceration and Stricture.

Ulceration of the Rectum.—Fissure and ulceration of the rectum are frequently met with in women, both being complicated by such affections of the uterus as endometritis, subinvolution, laceration of the cervix, versions and flexions. Operative interference with rectal disorder is certain to prove unsuccessful as long as the uterine complication remains unrelieved.

Symptoms. — If a woman complain of vesical irritation, with rectal distress and pain, both on defæcation and micturition, and no uterine condition be present to account for these symptoms, the rectum should be carefully examined for fissure or ulcer. It will be well to do this under an anæsthetic if the rectum is sensitive and the patient resists exploration. Nor should we be led astray by the proofs of existing cystitis, as a chronic cystitis is not uncommon in women who suffer from rectal disease.

Treatment. — The treatment of painful ulcer or fissure resolves itself into palliative and radical.

Under the head of palliative we include rest, due attention to, and regulation of, the bowel, the administration of mild laxatives, such as any of those already recommended, to secure an efficient but gentle aperient effect; the use locally, either in lotion or ointments, of sedative and astringent drugs, as opium, morphia, cocaine, belladonna, bismuth, calomel, tannic acid, hazeline, perchloride of mercury, and nitrate of silver; in severe cases, the careful application to the ulcer of either the acid nitrate of mercury or nitric acid. The radical treatment consists in operation by incision through *the entire base of the ulcer and fissure, with the division of the fibres and the underlying sphincter.*

The more we reflect on the insidious progress of rectal disease, the obscure, and in many instances remote, symptoms which attend incipient ulceration, stricture, or malignancy, as well as the reflex disturbances which are apt to divert our atten-

tion from the rectum to some other organ, the more necessary the injunction to the medical adviser to look to the rectum when such symptoms as those *of dysenteric and morning diarrhœa* (*jelly-like discharge*), *colicky pains*, *and tenesmus are complained of.*

Stricture.—Frequently the ulcer, or commencing stricture, is not close to the anus, but some two, three, or four inches from its margin, so that the examining finger has to be passed well up the bowel before the ulcer or stricture is detected. Women suffer, of the two, more than men from stricture of the rectum. It seems from statistics that constitutional syphilis in women, if it affect the rectum, is particularly liable to cause stricture.

Verneuil's operation of division of the entire stricture, or linear rectotomy, is that most frequently practised. In dilatation of a stricture, soft, bulbous-pointed, hollow bougies may be used; the surgeon should have some of these of different sizes by him; and it is by far the safest plan for the surgeon to dilate the stricture rather than permit the patient to pass the bougie herself. The larger sizes of my uterine bougies will be found to answer well for the surgeon's use. They must be used with gentleness.

I may here say that muscular 'spasmodic stricture of the rectum' is a very doubtful affection; moreover, I believe that in many of these cases of 'spasm' we have simply to deal with a neurotic reflex irritation (that there is no real stricture to necessitate dilatation is at once proved by an anæsthetic) which causes a tonic contraction of the sphincters, generally exaggerated by the presence of hard, dry and impacted fæces.

Malignant Disease.

The most prominent symptoms of malignant disease are: pain on and after defæcation; the presence of blood, both in the stools and when they are passed. Sometimes there is a semi-watery discharge, with a peculiarly heavy and fœtid odour. On examination there is a characteristic hard feeling, the extent of the roughness, or the 'broken-down' sensation, being

dependent upon the nature, duration, and extent of the disease. But the most important feature of this terrible affection for the young surgeon to keep before him is the very insidious nature of its onset, and the comparatively trivial symptoms which may accompany the first stages of the disease.

The prolongation of life or relief of symptoms will depend on the extent, number of adhesions (to vagina or uterus), and situation of the disease. Life may be prolonged by extirpation of the rectum, or colotomy.

Pain may be mitigated by opiates given internally, and other sedatives; the administration of morphia subcutaneously; opiate injections into the bowel; morphia suppositories; and the unpleasant odour controlled by the free use of disinfectants and antiseptics. A thymol injection helps to conceal it. I have found some benefit result from the administration of Chian turpentine.

Pruritus Ani.

Pruritus ani may be treated on the same principles as those followed in the management of pruritus vulvæ. As in this latter troublesome affection, pruritus ani has its origin in constitutional as well as local causes. All that has been said of the vulvar affection applies to that of the anus. Here, however, we have to remember that hæmorrhoids, fissure, polypus, thread-worms, vaginal discharges, syphilitic skin eruptions, may produce the itching, and that these must be cured before we can hope to relieve it. All superfluous tags of loose skin should be cut off. Scrupulous cleansing of the part night and morning should be enforced. A hypnotic may have to be given, such as trional or sulphonal, to secure sleep, and a rectal plug worn at night is useful. By following the same rules as have been laid down in pruritus vulvæ, while attending by local measures to the anus and rectum, not neglecting errors of a constitutional character, we seldom fail to bring about a speedy cure.

Procidentia.

It is well to remember that procidentia of the rectum is at times associated with polypus; and the practitioner should be careful not to mistake it for hæmorrhoids. Procidentia occurs perhaps more frequently in women than in men, and often increases to a large size. Van Bruen adopts a most efficacious plan of treatment. Longitudinal strips are made in the protruded intestine with a Paquelin's cautery, avoiding the large veins, and then the operator returns the intestine, having first *oiled it well*. After return of the bowel, he secures further contraction of the anal aperture by division of the sphincter with the Paquelin's knife in two places, and stuffs the wounds with oiled wool. Longitudinal and circumferential contraction is the result.

If a *polypus* be discovered in the rectum, torsion or ligature will be sufficient to remove it without danger.

Rectocele has been already referred to (see p. 280).

A Few General Therapeutic Hints.

Soothing Measures.—Great relief from rectal pain, from proctitis, or inflammatory hæmorrhoids, or threatening abscess, is often secured by the application of leeches round the anus. A warm toast poultice is a ready and grateful form of stupe to apply when the leeches are removed after incision of a pile. A piece of thick toast is made, on which boiling water is poured. The toast is squeezed between two plates, so as to press out the water, supported on a handkerchief, or covered with a piece of oiled silk; it is laid over the perinæum, and is maintained in position by a T-bandage. A piece of spongiopiline may be used for the application of sedatives to the anus. It is a clean and ready means of relieving pain. The warm sitz-bath is often very comforting to a patient, or the steam of laudanum-water placed in the night chair on which the patient sits. Suppositories of cocaine, or cocaine and belladonna, and cocaine with morphia, are valuable as local sedatives.

Hazeline is an admirable astringent remedy, both when given internally and applied externally for hæmorrhoids. Both the glycerols of tannin and of lead are useful external applications for fissure and hæmorrhoids. Goulard's lotion, in combination with the liquid extract of opium, is a capital sedative in hæmorrhoidal congestion and in ulceration.

Aperients.—In the instance of women suffering from external hæmorrhoids, the diet should be carefully regulated, and scrupulous cleanliness insisted on after stool; mild laxative medicines should be used, and such cholagogues as podophyllin, iridin, euonymin, with small doses of mercurial pill or hydrarg. cum creta. The aperient waters, Rubinat, Æsculap, Victoria, Hunyadi Janos, Friedrichshall, Carlsbad, may be given. The compound powder of liquorice is also a useful aperient for women. Also this mixture:

℞ Ext. cascara liq. ℥i.
Glycerine ℥i.
Aq. ad ℥viii.

The elixir of saccharin (℥i.) well takes the place of glycerine. ℥ss to be taken every morning early, and a little warm tea or coffee afterwards.

Cascara bonbons or tabloids are efficient modes of administering cascara.

Such a pill as the following will generally be found to act sufficiently:

℞ Pulv. iridin, Pulv. euonymin āā gr. ¾.
Hyd. cum cret., gr. i.
Ext. col. co., gr. i.ss.
Ipecacuanha, Ext. hyoscyami āā gr. ss.
Ft. pil.

Or, ℞ Pulv. euonymin, gr. i.
Pil. hydrarg., gr. i.
Pil. rhei comp., gr. ii.
Ext. nucis vom., gr. ss.
Ext. hyoscyami, gr. ss.
Ft. pil.

Or, ℞ Ext. belladonnæ, gr. ¼.
Ext. nucis vom., gr. ¼.
Pil. col. co., gr. iii.
Ext. hyoscyami, gr. ss.
Ft. pil. M.

The confections of sulphur, senna, and black pepper are useful laxatives, especially the latter. A good form is :

℞ Tartr. potassæ acid., ʒii.
Pulv. jalapæ, ʒi.
Confect. sulphuris, ℥i.
,, sennæ, ʒi.ss.
,, piperis nigræ, ʒss.
Mel. opt. ad ℥iv. M.
Ft. confectio ; ʒi. to be given as a dose.

The glycerine enema (ʒi. of glycerine administered with the glycerine rectal syringe) is in some cases an efficient means of emptying the rectum. Its action is, however, capricious, and is occasionally attended by severe pain. The suppository of glycerine made with two ends, conical, may be tried instead of the enema.

Calomel ointment, with bismuth and belladonna; liq. plumbi subacetatis ; ointment of bismuth with glycerol of lead ; ointment of tannic acid, with bismuth and opium, will be found soothing applications.

In cases of ulceration of the rectum, or fissure, ointments of bismuth (℥ss. of carbonate in ʒii.), calomel (ʒii. in ʒii.), morphia (gr. iii. ad gr. v. ad ʒii.), belladonna (gr. xxx. in ʒii.), pulv. opii (gr. xx. in ʒi.), may be used separately or in combination. For example, a most useful ointment is :

Bismuthi trisnitratis, ʒii.
Hydrarg. subchlor., ʒii.
Ext. belladonnæ, gr. xxx.
Ext. opii liq., ʒii.
Lanolin, ℥ss.
Aq. rosæ, ʒi.
Adeps benzoatis, ℥ss. M.

For application with the rectal positor the following will be found of service : Cocaine, both in the form of ointment and lotion for the relief of pain. Eucaine may be substituted for the cocaine. Iodoform can be applied as an ointment, internally, to the bowel, or dusted externally in fine powder diluted with starch (gr. x. to gr. xxx. ad ʒii.); calomel or

bismuth ointments, in combination with belladonna, opium, and tannic acid, are useful ointments for internal hæmorrhoids. In syphilitic cases iodoform ointment, or ointment of perchloride of mercury (gr. ii. to gr. v. ad ʒi.), is most useful. The odour of the iodoform may be disguised with vanilline or coumarine.

To apply an ointment to the rectum, an ointment positor is required, as otherwise the ointment is wiped off the surface of the finger before it reaches the part. Fig. 531 shows the ordinary ointment applicator. Messrs. Mayer and Meltzer

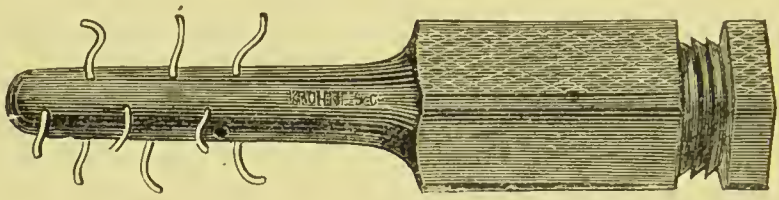


FIG. 531.—Ointment Positor.

have made for me a convenient positor. The ointment is contained in a tinfoil case, and the pipe is made of soft gum-elastic.

Astringents.—Tannic acid, gallic acid, acetate of lead in ointments; injections of matico and oak-bark; solutions of carbolic acid, chromic acid, nitrate of silver. Perhaps the best local astringent in cases of rectal hæmorrhage is the sulphate of iron, which may be used either in the form of ointment (ʒii. ad ℥ss.), suppository (gr. ii. ad gr. x.), or as the liquor ferri sulph., diluted according to the strength required.

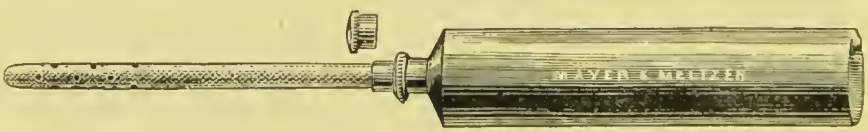


FIG. 532.—Rectal Positor of Author.

Caustics.—The acids, nitric, carbolic, and chromic, and the acid nitrate of mercury, are the most powerful caustics we can apply both to ulcers or bleeding mucous surfaces; of these

the acid nitrate of mercury is probably the best. The surface to be touched should be carefully exposed, and the acid applied with cotton-wool on a platinum or aluminium wool-holder. The part is well oiled after the application. For all cases where the actual cautery is required, Paquelin's instrument is the best.

CHAPTER XLVI.

STERILITY.

In a manual such as this it is not possible to discuss at length all the causes which result in sterility. No one has investigated these causes in the woman with greater minuteness than the late Marion Sims. Again and again he has examined the mucus of the cervix uteri a few minutes after intercourse to determine the presence or state of the spermatozoa contained in it, or the quantity of seminal fluid retained in the vagina. He, first, succeeded in impregnating the woman by the injection of semen into the uterus, though the patient unfortunately miscarried at the fourth month from a fall. During two years he made as many as fifty-five uterine injections of seminal fluid. We may thus summarize the most important facts in relation to sterility:

1. In order for conception to take place it is not absolutely necessary for penetration to occur. See pp. 9-12, on the Hymen.

Artificial fecundation is not resorted to, so far as I know, by any gynæcologist of position in Great Britain. One writer, within recent years, has tabulated the condition in which such intra-uterine injections of seminal fluid are indicated (Mantegazza).

2. The spermatozoa will travel a considerable distance and live for several hours in a suitable medium and at a proper temperature.

3. It is necessary that the seminal fluid should contain healthy active spermatozoa, that it should be retained in the

vaginal canal, and, if possible, that ejaculation should occur in the axis of the cervix and of its opening.

4. If healthful semen be deposited in the vagina within a few days before, and within ten days after, a menstrual act, conception is more likely to occur.

To complete these conditions we require a sufficiently long vagina with due tonicity of its walls, and the uterus as nearly as possible in its normal axis; the uterine and vaginal secretions healthful, and contact, at the right time, of the ovum with the spermatozoa.

We may thus classify the principal causes of sterility :*

Congenital ...

1. Absence of the ovaries.
   ,, ,, Fallopian tubes.
   ,, ,, uterus.
   ,, ,, vagina.
   Very short vagina.
2. Atresia of the Fallopian tubes.
   ,, ,, uterus.
   ,, ,, vagina.
3. Imperforate hymen.
4. Conoidal uterus, stenosis and occlusion of the os uteri or cervix.

Acquired ...

1. Strictured states of the Fallopian tubes.
   ,, ,, uterus.
   ,, ,, vagina.
2. Tumours obstructing the Fallopian tubes.
   ,, ,, uterus.
   ,, ,, vagina.
   ,, ,, vulva.
3. Displacements of the Fallopian tubes.
   ,, ,, uterus.
4. Inflammatory states of the genital tract — especially chronic endometritis.
5. Chronic metritis.
6. Disease of the ovaries.
7. Ovarian dysmenorrhœa.
8. Membranous dysmenorrhœa.
9. Menorrhagia.
10. Dyspareunia—painful intercourse from any cause.
11. Vaginitis and vaginismus.
12. Gonorrhœa and its consequences.
13. Syphilis (in the sense that it destroys the vitality of the ovum).

* See especially the chapters bearing on dysmenorrhœa, dilatation of the cervix, stenosis of the cervix, congenital malformations, gonorrhœa, and

The reader will refer to the chapters in which each of the above-mentioned causes of sterility in the woman is discussed.

Sterility not due to Defect in the Female Generative Organs.

The possibility of the cause of the sterility resting with the husband, and not with the woman, has to be remembered. The fact that many women who are barren with one husband are fertile with another is not to be overlooked.

Sterility in the male depends on more than want of a healthy erection. The seminal fluid must contain virile spermatozoa. Therefore a man may not be impotent and yet be sterile. Strong sexual desire and power may thus be, as Curling has shown, co-existent with sterility, and, through the absence of conception, may be the cause of serious affections of the sexual organs in women. Thus a clear distinction has to be kept in mind between the terms 'sterility' and 'impotence.' Those inhibitory forces which overcome the reflex excitation in the sexual centre, and thus inhibit the normal process of erection in the male, have to be kept in mind in the treatment of male impotence. It is a matter of common observation that the cerebral impulses are blunted or arrested by excessive mental strain, and are held in check by healthful and continuous brain work. This relation of cerebral control to erection and seminal discharge is shown physiologically in the case of spinal injuries, cerebral concussion, and the seminal emissions which result from hanging. Cerebral inhibitory control is lost.

Clearly, then, the virile powers and health of the husband have to be inquired into when we are consulted by a woman on account of her sterility. It must also be remembered that the general health in both the woman and the man has a potent influence on fecundity.

Gross has estimated that one male in every six is sterile. This is probably too high an estimate. It is certainly much higher than the estimated sterility

vaginismus. It is very doubtful how far, in a woman capable of procreation, mere contraction of the lumen of the uterine canal is to be regarded as a cause of sterility—probably very seldom.

of women. There may be *incompatibility* of the sexes, and sterility as a result, though neither the man nor woman is sterile, for either separately may be fertile to another person and procreate.

Certain points have to be carefully inquired into of the husband :

(1) Are there healthy erections? (2) Are there nocturnal emissions? (3) Is semen ejaculated during intercourse? (4) Does emission occur prematurely, or is there incompletc coitus? (5) Is there sensation? (6) Is there pain in the penis with intercourse? (7) Is there any affection of the prostatic urethra or prostate gland? (8) Does he masturbate? (9) Is there stricture of the urethra in any part? (10) Is the foreskin tight in erection?

It may be well to summarize the causes of sterility and impotence in the male.

Impotence.—Gross subdivides the causes of *impotence* under the four heads : *Atonic*, *Psychical*, *Symptomatic*, *Organic*. And we may further briefly classify (following this authority) the causes of impotence thus :

Atonic ... Muscular paresis both in the walls of the vessels and in the muscular trabeculæ and the perinæal muscles, brought about by Masturbation or Venereal excess causing exhaustion of the lumbar centre.

Sexual desire present : Ineffectual erection and ejaculation. Premature emission. Incomplete intercourse.

Sexual desire absent—Loss of erectile power.

Symptomatic ... Loss of sexual power from a prolonged or excessivc use of bromidc salts, iodine and iodide salts, camphor, conium, opium, morphia (in lead-poisoning), alcoholism, antimony fumes.

Sterility.

Azoaspermia—absence of spermatozoa .. ... The fault may be due to absent, retained, undeveloped, diseased testicles ; obstruction in the epididymis and vas deferens, or injury to the latter during operations ; disease of the same parts, possibly due to past gonorrhœa or syphilis.

Aspermia—want of ejaculation of semen during coitus ... ... Organic obstruction — ejaculatory ducts or urethra.

Atonic—want of excitability in the ejaculator centre.

Anæsthetic—loss of sensibility in the nerves of the penis.

Psychical—cerebral inhibition.

Organic-obstructive ...	Absence of the penis or other abnormalities, including hypospadias and epispadias; curvature of the penis, the result either of congenital defects, wounds, or growths in one or both of the corpora cavernosa, varix of the dorsal vein, tight prepuce, short frænum, retained testes, atrophic testicles produced by any cause, syphilitic and tubercular orchitis.
	May be due to congenital defects, stricture in the ejaculatory ducts and urethra, stenosis in the ejaculatory ducts, spasm of the urethra.
Atonic	Want of contractile power in the seminal vesicles, ejaculatory ducts, urethral muscles; incomplete coitus results—the act is abandoned from loss of strength.
Anæsthetic	Insensibility in glans, prostatic sinus, or prostatic urethra.
Symptomatic	During phthisis, Bright's disease, spinal curvature, degeneration of the cord, spinal injuries, after the zymotic fevers.
Psychical	This head includes any variety of mental deterrent influence, such as nervous apprehension, remorse, physical repulsion, want of affinity, and other purely psychical causes. This class includes generally all those imaginative victims of advertising quacks.
	There may be inhibitory restraint voluntarily exercised during coitus.

The reader will find an admirable summary of the entire subject in Mr. Jacobson's classical work on 'Diseases of the Male Organs of Generation' (Churchill, 1893).

Many cases are curable by proper treatment and judicious advice to both the husband and wife. At times every effort to bring about the desired result fails. Such cases must, however, constantly come before the gynæcologist, for there is no doubt that, in addition to the unhappiness caused, they are the frequent sources of morbid states of the uterus and annexa. Hyperæsthesia of the vulva, vaginitis, erosion of the cervix uteri, ovaritis or salpingitis, are their not uncommon accompaniments.

A lady, now thirty-two years of age, conceived under these circumstances. She consulted me in July, 1891. She had been then married for five years.

There had been no intercourse for a considerable time after marriage. The husband suffered from atonic and psychical aspermia. Of this he was, after some difficulty, cured by the late Hack Tuke, to whom I was indebted for the case. The wife suffered from dysmenorrhœa. On examination I found a typical conical-shaped cervix and a minute uterine orifice. She had the internal cervix divided. The canal was with difficulty kept patent. She went through a course of internal faradization for the dysmenorrhœa. Of this she was cured. But conception did not occur for a length of time, though the canal of the uterus remained permanently dilated. She now has a child. This is a good example of the source of sterility being traceable to both male and female sexual defects. It is also a proof of the advantage of protracted treatment judiciously applied in both instances.

I am aware of another case in which no healthful intercourse occurred for over five years, though the husband had pleasurable healthy emission. There is now a family.

One caution I think it well to give the young practitioner. I would say to him: 'Do not be led away by the miraculous cures of sterility you hear of, or the occasional success you may yourself meet with in rectifying some obstruction to impregnation, to hurriedly perform operations on the uterus with a view of "curing sterility." Bear in mind, in the first place, that failure will attend a large proportion of such operations. The patient should be frankly prepared for this. Remember also that serious consequences often follow these uterine operations, though we do not hear of them, and that barrenness has all its evils aggravated ten thousand times, when the miserable hypochondriac passes from hand to hand, the victim of delusive hopes and disappointing operations.' Far otherwise is it when some diseased or abnormal condition of the uterus exists which it is our duty to treat by operation, and the cure of which may bring about a possibility of impregnation. Nor do I mean to deprecate any justifiable and judicious interference with an otherwise healthful woman who happens to be barren, in order to bring about conception. But I do mean to insist that the surgeon incurs a grave responsibility who operates on a woman otherwise in perfect health, as many barren women are, if there follow either directly from the operation, or indirectly from the results, dangerous or permanently serious consequences, even though she and her husband may accept any risk entailed by the operation.

CHAPTER XLVII.

GYNÆCOLOGICAL ELECTRO-THERAPEUTICS.*

Many gynæcologists have given the treatment of various uterine affections by electro-therapy an impartial trial, and have reported favourably of this conservative therapeutical step. It is only right to repeat what we have elsewhere noticed, that Cutter, of America, had long practised and urged the value of the electrical treatment in various uterine affections. Apostoli himself acknowledges his indebtedness to A. Tripier, who 'devoted thirty years in a glorious scientific struggle to seek a panacea for metritis in the induced current of quantity.' And as far back as 1873 Routh and Althaus used continuous currents of high intensity in the treatment of uterine fibroids. But to Apostoli belongs the credit, as he himself puts it, of supplanting the old way of operating by a method more 'precise,' 'energetic,' 'tolerable,' 'better localized,' 'more thoroughly under control,' and 'scientifically exact.'

Obviously in a manual such as this it is impossible to do more than summarize the principal details of this treatment; and for this reason, if for no other, I shall confine myself to a simple description of Apostoli's electro-therapeutic operative measures, and the particular precautions on the necessity for which he lays such emphasis. To discuss fully all the objections which have been raised, and the attacks which have been directed against this treatment, would be impossible, and those

* With regard to the résumé in this work on the subject of electro-therapeutics, Apostoli, writing to the author in 1890, said that it was a 'complete résumé of the subject,' and that 'in a succinct manner it laid down all the principal facts of this comparatively new science.'

who are interested in the subject will find in the periodical literature of the past few years ample material to consult on those matters. I have had in one case of my own clear evidence that, even when surrounded with every precaution conceivable, this method of treatment is not devoid of danger, and that death may occur, whether due directly to the operative procedure itself, or indirectly to it and other unfavourable circumstances in the patient. In the instance I refer to the patient was a woman of a nervous temperament, manifested at times by attacks of a hystero-cataleptic nature. These nervous attacks were precipitated by violent uterine hæmorrhages, and were attended with the most severe flatulent eructations I have ever heard. Great success with any operative procedure, even in hands the most endowed by Nature with manipulative dexterity, and guided by intellect the clearest, can only be attained with an experience in which some failures or blunders have taught the lessons which have ensured the ultimate approach to perfection. As characteristic of the different opinions on the value of the method of Apostoli we may quote the following views of Rokitansky, A. Martin, and Mackenrodt:

Rokitansky in Vienna (*Wiener-klin. Wochenschrift*, 1890, Nos. 47 and 48) reported results of cases treated during two and a half years. There were twenty-two fibromata of the uterus, one peri- and para-metric exudation, and eighteen cases of the various forms of chronic endometritis. The total number of sittings amounted to about 650. The greatest number that any one patient was subjected to was sixty-three. Duration of the sittings varied between five and ten minutes (in two cases twelve minutes). The intensity of the current seldom exceeded 100 to 110 (once 300) milliampères. This plan of treatment is valuable, but even when used correctly and with care it has its dangers, is painful, slow, and does not always produce the desired results, and is often only a palliative measure.

A. Martin and Mackenrodt (*Deutsche Medicinische Wochenschrift*, No. 2, 1892) treated sixty-six cases of uterine myomata. In the first group (55·5 per cent.), for the most part with small tumours, the results were favourable, in so far as hæmorrhage and pain were lessened and the general condition was improved. On the other hand—

1. There was no case in which the tumour disappeared;
2. Nor was the size of the tumours diminished, beyond all doubt.
3. In twenty of the thirty-six cases the menopause occurred during the treatment, with regressive changes in the tumours.
4. In twelve the improvement was not entirely permanent.

5. In 44·5 per cent. there was no improvement at all; the condition of the patients grew worse, and three cases, 8·3 per cent., died during treatment.

On the ground of their experience and that of others, the authors reject the Apostoli treatment of myomata.

Analyzing recent statistics of Keith and Schäffer, they found that of 212 cases, in 32 per cent. the symptoms were relieved; in 44 per cent. they became worse, and nine patients (4·3 per cent.) died. In no instance did the tumour disappear. Moreover, the so-called 'symptomatic cure' was only permanent when the patient was near the menopause at the time of the treatment; before this period the hæmorrhage frequently occurs.

Granting that electricity is a palliative means of treating fibroids, it remains to inquire why the results are so variable. The explanation is to be found in the histological peculiarities of the tumours in different cases. Thus, among 356 cases treated by Martin in his private hospital, in fifty-three the tumour was cystic or malignant; in twenty-three there was accompanying disease of the uterus (cancer or pregnancy); in forty-three marked disease of the adnexa. Since most of these complications could not be recognised before the abdomen was opened, it was evident that there was some risk in the electrical treatment. As regards the extirpation of the myomatous uterus, the writers report twenty cases of laparo-hysterectomy with two deaths (neither from sepsis), and fourteen cases of vaginal extirpation, with no deaths. Including five successful cases of enucleation, the entire mortality is 5 per cent., as compared with 4 per cent. with the electrical treatment. Considering the difficulty, loss of time, and discomfort to the patients attending the latter, and the fact that in more than a third of the cases they became worse, the writers have entirely abandoned it. Fibroid tumours which give rise to only slight symptoms receive no local treatment at all. If serious disturbances be present, the patients are operated upon.

None who carefully read Apostoli's review of his own work, of his acknowledgment of 'blunders' made in carrying out the treatment, of the cautions he gives as to exactitude of dose, antiseptic precautions, and all the other details of operations, the performance of which demands that the operator be 'both gynæcologist and electrician,' will refuse to admit that the risks to the patient are in inverse ratio to the experience of the operator. Therefore does it behove every beginner to err on the side of excess of caution, to surround his patient with every possible safeguard both before, during, and after operation, in careful antisepsis, in regulating the strength, character, and extent of the electric application, as well as the length of time it is applied, and in estimating the tolerance of the patient and her special susceptibilities to electrical influences. But something else of greater importance still is demanded of the operator, and without securing which all these safeguards may

be valueless, viz., an accurate diagnosis. If it be true that the most experienced of us are liable to err, that our greatest gynæcologists have placed on record errors both avoidable and unavoidable, and that Apostoli himself tells of his 'not recognising a suppurating ovarian cyst which ended in death from peritonitis,' how careful must the young surgeon be to make assurance doubly sure before he resorts to electrolysis, and decides on the extent to which he will avail himself of it, or the exact mode in which he will apply it. In a short summary, such as this is, of uterine electro-therapeutics, I prefer to limit it to the lines marked out by the work of Apostoli himself, the apparatus he approves of, the explicit directions that he gives, the cautions he enforces, and the indications for the different methods of treatment that he has laid down. I hope so far to compass this as to enable any intelligent practitioner, from the perusal of these directions and descriptions, to put in practice either mode of treatment, whether by faradization or galvanization. Obviously a previous, at least elementary, knowledge of the laws of electrical forces must be assumed on the part of the reader of such a manual as this is, and to acquire some acquaintance with the modes of action, physical, chemical, and therapeutical, of the different kinds of electricity on the human body is essential before resorting to this method of treatment.

Details of Methods.

In order to understand the details of these electro-therapeutic measures we have to consider :

1. The preliminary measures and precautions.
2. The appliances necessary for—
   (*a*) The faradic treatment ;
   (*b*) The galvano-caustic treatment.
3. The gynæcological indications for these therapeutic methods.
4. The details of—
   (*a*) The faradic method ;
   (*b*) The galvano-caustic method.

It must be well understood that before beginning any

electrical treatment *a clear diagnosis is essential.* And even more than an accurate knowledge of the local conditions we desire to treat is necessary. *The temperament of the woman*, the state of her general health, apart from the uterine and ovarian pathological state we are anxious to influence, have to be taken into account, and might altogether contra-indicate its employment. To determine the presence of such collateral conditions it is well to have the patient a short time under observation before commencing treatment. A careful exploration of the pelvic viscera should be made, beginning with the *condition, dimensions, thickness of the parietes, and position of the uterus.* The vaginal cul-de-sacs should be carefully explored, and the state of the ovaries, so far as possible, ascertained. The history and evidences of recent or past attacks of *perimetritis*, or pelvic peritoneal inflammation, should be inquired into. Any *ascitic accompaniment* of uterine disease must be noted, and its cause discovered. The *urine* should be examined. The so-called *neurotic and hysterical temperaments* must be taken account of. *They seriously influence the tolerance on the part of the patient of either form of electrical treatment.* Their presence and this intolerance will influence the practitioner in the dosage and intensity of the current he employs. There is the question *of the place at which the treatment is carried out.* Whatever may be said of the faradic treatment, which it is quite possible to pursue in the study of the practitioner, and some milder applications of the galvanic current, I maintain that all the severer cauterizing applications should be done with the patient in bed. This is the only safe rule. A patient is liable to accidents, shocks, falls, the influence of cold and draught, passing to and from the physician's residence, that may cause trouble which she is not liable to in bed. Besides, it is well to let the patient rest for a time, even after any form of electrical treatment, and this is not so easily done in the practitioner's house. Sexual intercourse has to be prohibited.

The Monthly Periods.—It is wisest to desist from operations approaching the time of a period, and not to commence

LEEDS & NI... MEDICO-CHIRURGICAL SOCI...

the treatment for a week after the menstrual flow has ceased. This rule applies more particularly to cases in which galvanic puncture is practised for pelvic exudations, and in cases of metritis where galvanic cauterization is made use of.

To secure thorough Asepsis.—In every instance in which an electrode is introduced into the uterus, or into the vaginal cavity, whether for purposes of faradization or galvanization, it should be thoroughly cleansed, and dipped in antiseptic solution. The vagina should be washed out with a perchloride of mercury solution (1 in 5,000) both before and after the sitting. If specula be used, they should be carefully disinfected; *so should the hands of the operator.* If a patient have to go out after the application of the faradic or galvanic current, it is safer to place an antiseptic tampon in the vagina with a string attached, which she can remove subsequently.

Certain Measurements in cases of fibroid tumours should, Apostoli advises, be taken and registered before beginning any electrical treatment, viz.: (*a*) The circumference of the abdomen at two or three points. (*b*) The exact thickness of the layers of skin and fat above and below, to the right and left of the umbilicus, taken by means of a graduated compass. (*c*) The weight of the patient.

Appliances required for Faradic Treatment.

Battery.—A battery is required which shall yield both low and high tension currents, capable of being increased without any sudden jerks, so as to avoid

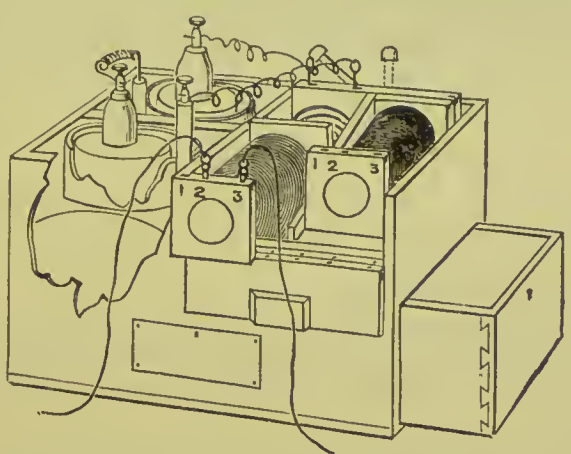


Fig. 533.—Faradic Current Battery.

the infliction of shocks. For this purpose the sledge-coil is the best. High-tension bobbins of very thin wire slide over the low-tension bobbins of thick wire.

Such a battery as that shown at Fig. 538 (Coxeter) will be found to answer

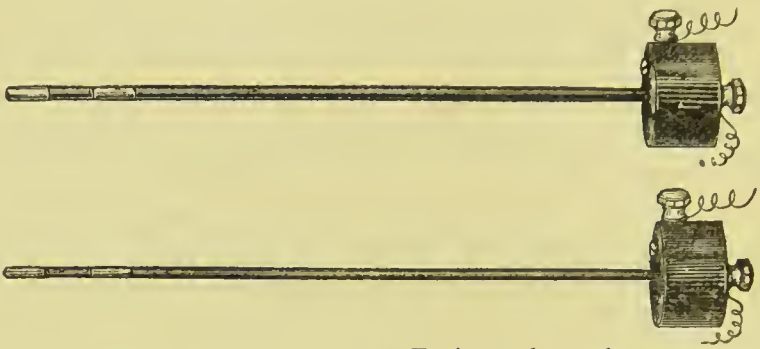


FIG. 534.—Bipolar Intra-uterine Exciter, of two sizes.

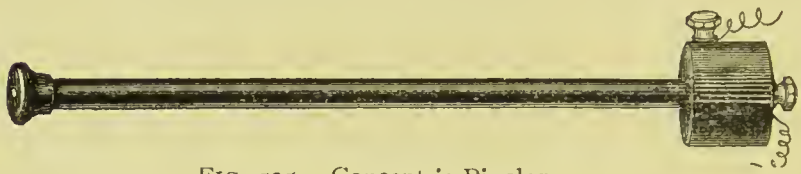


FIG. 535.—Concentric Bipolar.

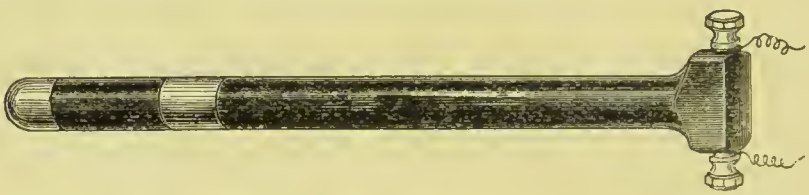


FIG. 536.—Bipolar Vaginal.

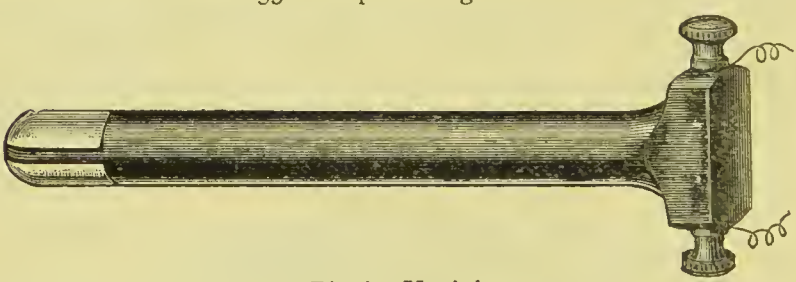


FIG. 537.—Bipolar Vaginismus.

the purpose admirably. There are two bobbins of different thickness of wire, and thus a current of medium or high tension can be obtained. The terminals needed are :

Bipolar intra-uterine exciters (two sizes).

A concentric bipolar electrode, for application to the uterus.

A bipolar vaginal electrode. The insulating substance is placed horizontally between the metal terminals, these latter being at some distance from each other.

A bipolar (vaginismus) vaginal electrode. The insulating substance dividing the electrode into two is very thin, and placed vertically, and

the poles are thus carried to the end of the electrode, so that it can be applied to any painful, sensitive, or neuralgic spot. All these terminals are insulated, so as to avoid any accidental shock to the administrator.

A monopolar vaginal electrode can be had, and a small plate or electrode for applying over the abdominal or suprapubic region on the skin, or elsewhere, in any case in which we desire to complete the current throughout the integument. The cost of these faradic appliances, including battery, is about £11.

Appliances required for Galvanic Treatment and Galvanic Cautery.

The fixed battery must be composed of large cells placed on shelves in a dry room. They last a long time, are easily renewed, and serve other purposes than that of electrolysis, as, for instance, electric illumination. The current can be carried a distance by means of suitable wires, and connected with a con-

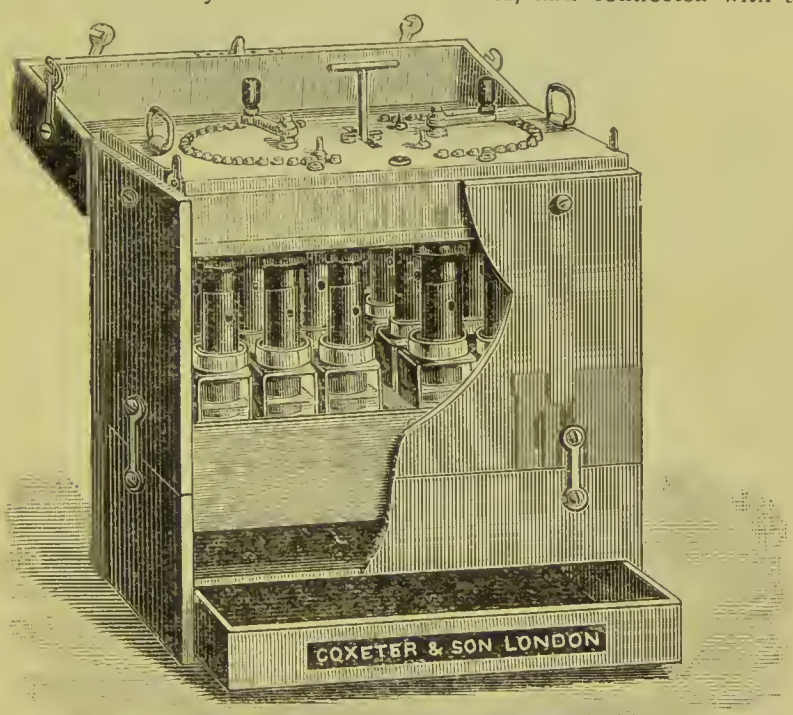


Fig. 538.—Apostoli's Sulphate of Mercury Battery.

venient element board. Such batteries answer well for hospitals. [The total cost of fixing these batteries and cables, etc., is about £25.]

A sulphate of mercury battery, twenty-four cells, with double collector, by means of which each cell can be tested separately. This battery remains in action so long as the fluid is kept in contact with the elements. The cells, when out of use, are therefore lowered by means of the cross-handle shown in the engraving.

The modified Leclanché battery, low tension, mild current, is shown at p. 176; with it is a collector, interrupter, current reverser, and galvano-meter.

Accessories and Electrodes.

Gaiffe's galvanometer. The figure shows the galvanometer in its copper cage, which is fixed on the pedestal by a ring. The multiplying frame,

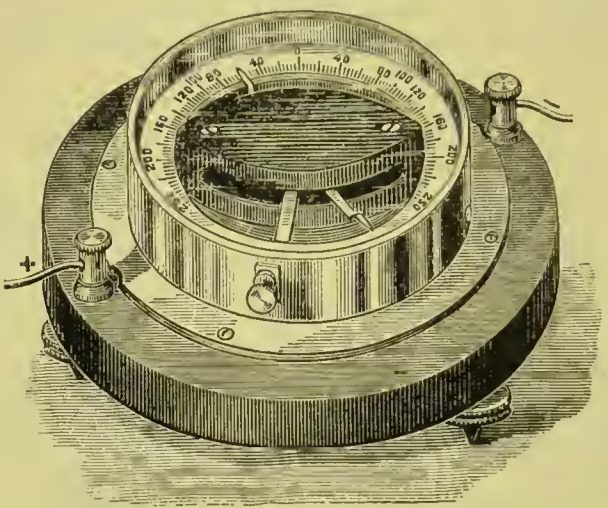


FIG. 539.—Galvanometer graduated to 250 milliampères.

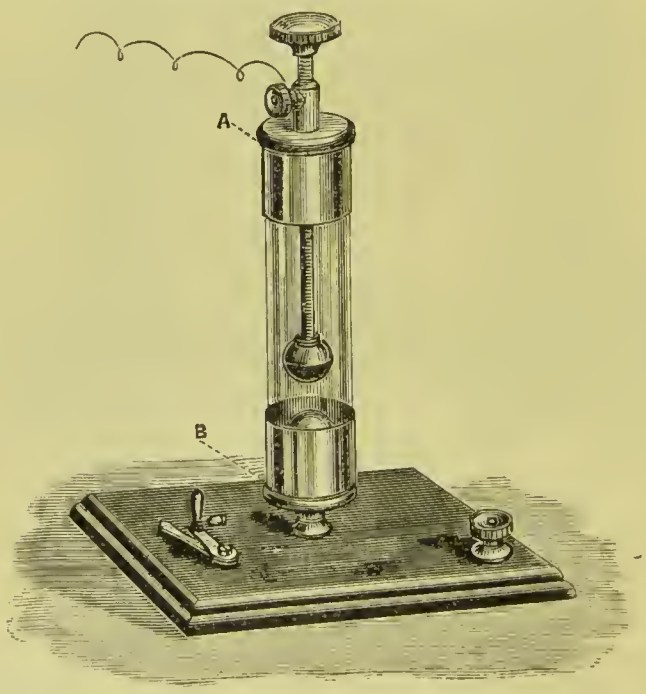


FIG. 540.—Water Rheostat. A, B, screws for opening rheostat; C, D, for attachment of wires.

graduated circle, needle, and needle-balance are shown. When not in use the needle-balance should be brought into action, so as to prevent the needle moving on its pivot.

The water rheostat is introduced to equalize the current and regulate it so as to prevent shock. The resistance is increased or decreased by depressing or elevating the metal piston. The rheostat and galvanometer are introduced between one pole of the battery and the clay electrode. The rheostat should be regulated daily. It is better to refill it each day, and the surgeon should test the strength of the current carefully. A little salt should be added with the water in the rheostat.

Buckmaster (New York) has devised a rheophore, in which the level of the water is raised and lowered at pleasure by means of a syphon and spigot, which allows the water to run drop by drop, and thus it insensibly regulates the force of the current.

Gas-Carbon Sounds of Apostoli.

The object of these sounds is to enable the operator to gradually increase the size of the gas-carbon terminals, so as to arrive at a perfect co-aptation of the electrode to the uterine cavity. The electrode consists of :

(M) Handle for attachment of rheophore.

(E) Caoutchouc covering of the metallic stem, which is marked by circular grooves at regular distances of $2\frac{1}{2}$ centimètres.

(C) Gas-carbon terminal $2\frac{1}{2}$ centimètres long. This, being attached by a screw to the end of the metallic stem, may be replaced by others of different diameters. These progressively increasing diameters are shown by the circles.

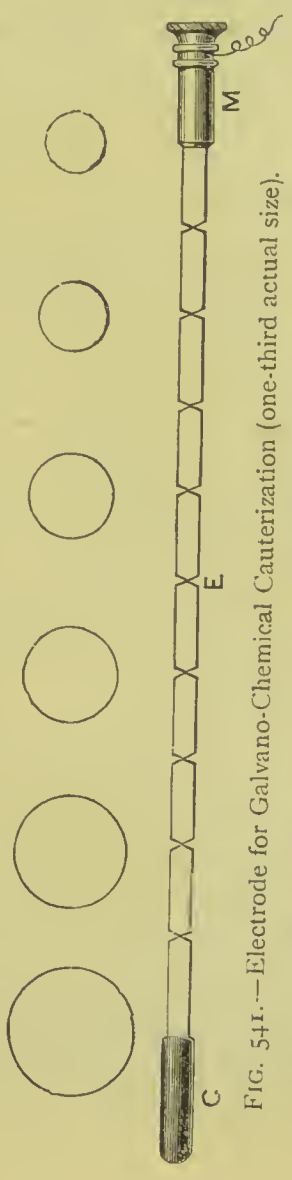


FIG. 541.—Electrode for Galvano-Chemical Cauterization (one-third actual size).

FIG. 542.—Gas-carbon Electrode.

The Abdominal Electrode of Clay, as used by Apostoli.

Amand Routh devised a flat tray, into the upper part of which a plate-electrode is fixed. The clay is placed in this tray, and if it be kept in a shallow basin of salt water the electrode is always ready for use, and the mess caused by the clay is avoided.

Inglis Parsons uses copper and lead plates with an insulator which surrounds the edges ; about six layers of linen, damped with water, are placed between the plates and the skin. The patient can hold the electrode in position herself.

The cost of the necessary appliances for carrying out the galvanic treatment will be about £20.

Other Accessories.

FIG. 543.—Rigid Platinum Sound.

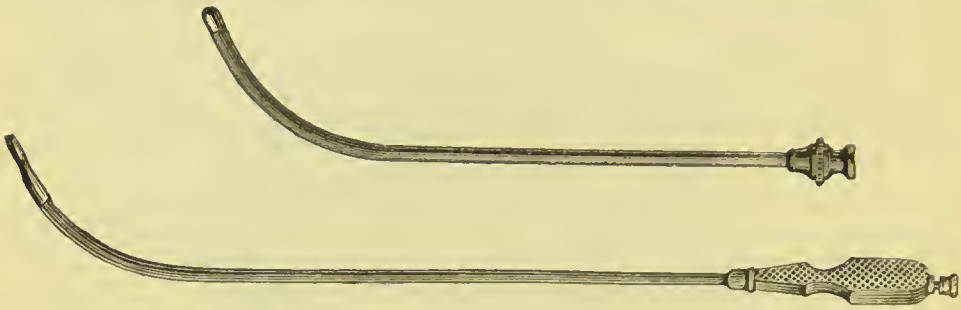


FIG. 544.—Platinum-ended Sounds with Flexible Stems.

INDICATIONS FOR ELECTRO-THERAPEUTIC METHODS.*

1. FARADIZATION.

Low-tension current (primary helix and thick wire bobbin).

Arrested involution and secondary post-partum hæmorrhage.
Sub-involution.
The acute stages of perimetritis and ovaritis.
Chronic metritis.
Menorrhagia.
Amenorrhœa.†
Dysmenorrhœa.†

High-tension current (thin and long wire bobbin).

Vaginismus.
Oöphoralgia.

* These indications are those laid down by Apostoli. The author does not assume any responsibility in quoting them.

† Lapthon Smith, of Montreal, after the use of the negative pole, and currents of weak intensity—20 to 50 milliampères—writes strongly in its favour in the treatment of dysmenorrhœa. Several other authors have written of the value of intra-uterine electrization in the treatment of menorrhagia and amenorrhœa.

Nitot, of Paris, recommends the intra-uterine application of the negative galvanic currents for functional amenorrhœa—currents of 30 to 40 milliampères—for five minutes, previous to the catamenia.

Byrne, of Brooklyn, prevented recurrence of malignant disease of the uterus in 153 cases out of 367 by the application of the galvano-cautery.

Salpingo-ovaritis.
Various manifestations of hysteria.
Perimetritis (Apostoli).
Coccygodynia.

2. GALVANIZATION.

Galvano-chemical cauterization in—

Fibroid of the uterus—polypi.
Hypertrophy of the uterus.
Sub-involution.
Acute and chronic metritis—endometritis.
Ulceration of the neck of the uterus.
Peri-uterine inflammation (parametritis, perimetritis, phlegmon).
Oöphoralgia.
Ovaritis and periovaritis.
Salpingitis.
Ovarian and tubular cysts at an early stage.
Atresia.
Hæmatocele.
Malignant disease (Byrne).

Galvano-chemical puncture in—

Certain cases of fibroid tumour in which the sound cannot be passed, and as an adjunct to intra-uterine galvano-cauterization in other cases.
The sub-acute stages of cellulitis and perimetritis with effusion.
The same affections, if suppuration has occurred.
Salpingitis, with effusion, and pyo-salpinx.

The advocates of the treatment of uterine fibromata by electro-therapy, both at home, in America, and on the Continent, have brought forward a large number of cases establishing the benefit which has followed from Apostoli's treatment. In the gynæcological clinique of Chrobak of Vienna, Ludwig Mandl and Winter's conclusions do not differ in some respects from those of Apostoli. They consider that repeated applications of the positive pole is a sure method for the cure of true endometritis accompanying myoma, and that it is suitable in all forms of endometritis except those complicated by peri-uterine inflammation. These authors do not approve of galvano-puncture. The pain and fever, the attendant necrosis, and possible

secondary infection, which cannot often be avoided, are the principal accidents on which they base their objections. They hold that a conservative method which, besides requiring a great armamentarium, calls for repeated anæsthesia, confinement in bed, and is not exempt from danger, is not superior to surgical treatment. Other authors, however, such as Massey of Philadelphia, are warm partisans of this method in the case of large interstitial tumours which are not accessible beyond the pubes.

Details of the Faradic Method of Apostoli.

The battery figured at page 851 is used. If a current of quantity be required, as in cases of amenorrhœa or hæmorrhage arising from arrested involution, the thick wire bobbin is used.

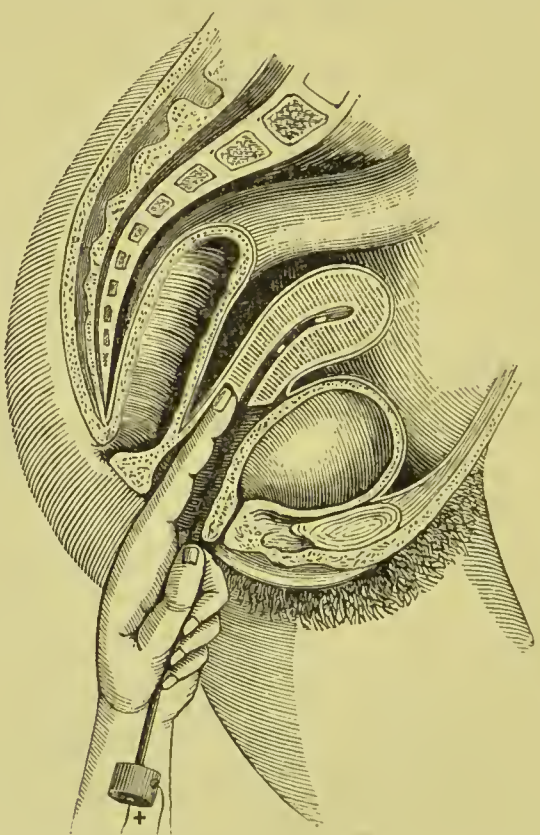


Fig. 545.—Showing the Electrode in the Uterine Cavity (Bigelow).

If, on the other hand, the current of tension be indicated, as in the pain of oöphoralgia, dysmenorrhœa, and in salpingo-ovaritis, the thin and long wire bobbin is used.

1. Commence with the simple vaginal application, using a long bipolar electrode.

2. Let the current be *very mild* in the first application. Avoid the infliction of any shock, and be most careful of any sudden jerking motion of the bobbin.

3. Carefully judge by the countenance and expression; by questioning the patient of her tolerance of the current.

4. Apply the 'vaginismus' electrode to the most painful spot in the vaginal roof, and the 'concentric carbon' uterine electrode to the cervix uteri.

5. After a few such sittings (if indicated) apply one of the bipolar intra-uterine sounds, with the same extreme care to avoid the infliction of shock, and only such pain as is easily borne by the patient.

6. One sitting daily will, as a rule, be sufficient. This should last from five to twenty minutes, its length being regulated by the effect produced.

7. The bipolar sound should not be introduced into the uterus during the progress of any acute inflammatory affection of the uterus, ovary, or Fallopian tube.

Details of the Galvano-Caustic Method.

Galvano-chemical Cauterization.—I here summarize some of the original directions of Apostoli for the practice of electrolysis in metritis and endometritis:

Preliminary Precautions.

General Preliminary Precautions to be always observed.—Careful antiseptic precaution both with regard to the patient and the operator. Close attention to the coupling of the battery and the perfection of the current. Testing of the battery for this purpose, and correction of any errors of connection. There is a first principle which ought to be engraved in the thoughts of all gynæcologists, and that is that the uterus will bear anything on two conditions—first, that a good antisepsis is obtained; and, secondly, that nothing roughly is done to it. Thus, it will support a current which is fearfully intense, provided that you inflict upon it only a progressively increasing dose without shock or jerk. The only way not to violate this rule is to possess a collector which will permit of your giving it the current cell by cell. Always employ a rheostat to modify any shock and regulate the electrical transitions. Connect the galvanometer, having first seen that it is in perfect order. There are two ways of fixing the

galvanometer—either on the cabinet which contains the battery, or it is independent, and introduced into any point on the circuit at the will of the operator. The battery, collector, and galvanometer having been tested, place them near the operating bed or sofa, so that, without moving, we can on one side stretch out the hand and easily move the handles of the collector, and on the other hand be able to see and follow without difficulty during the whole operation the oscillations of the galvanometer. Adjust the needle, or, rather, turn the multiplying scale until the zero on the compass corresponds exactly with the needle. Pass the hysterometer through the flame of a spirit-lamp, and then plunge it, handle and all, into a strong carbolic solution. Arrange the length of the intra-uterine sound, in drawing it out from the handle, according to the previously-determined or the probable length of the uterus. Then cover the sound with an insulating sheath of celluloid. Attach the rheophores, or, better still, one rheophore first, to the metallic plate which lies upon the clay. See if the clay be in the proper condition for humidity, and especially that it thoroughly moistens the tarlatan. Use every means of reassuring the patient that the operation is quite bearable and of keeping her absolutely quiet. Her breathing should be unrestrained. Get her completely under control. Quickly place the clay on the belly, above the pubis, and away from the hairs. Warn the patient that it is always cold, but that this disagreeable feeling will soon disappear. Cover it with a dry cloth, such as a folded towel, for instance, on which the woman is to place her two open hands side by side, so that she may exercise a slight pressure on the clay, in order to render it more uniformly and completely applied to the skin. *Never apply the clay to the skin without having first determined that the epidermis is healthy, and there are no pimples or abrasions, nor any wounds of any kind, no matter how small.*

The Sound.—The introduction of the sound into the uterus is the most important stage, and exacts the greatest care and practice. No force should be used in its introduction ; on the contrary, the greatest gentleness must be employed. Do not use any speculum. The vagina must be well protected by the insulatory material. The rheophore is now attached to the intra-uterine exciter, and it is fixed firmly in the circuit.

The operation may be divided into three stages—the initial stage, the middle, and the end.

Initial Stage of the Operation.

(*a*) Do not begin to turn on the current until all pain or sensibility resulting from the passage of the sound has totally disappeared. A few seconds of waiting are sometimes necessary for this purpose.

(*b*) The hand which holds the sound steady should not again move ; in order to give it more security, it is better to leave the conducting finger in the vagina, where, if we are sufficiently sure of ourselves, we hold the sound by the handle ; the dorsal surface of the handle will rest against the internal surface of the corresponding thigh of the patient.

(*c*) Watch the compass to see how it answers to the passage of the current, and at the same time do not lose sight of the countenance of the patient, which will warn you of all the sensation she feels.

(*d*) The hand which remains free should be placed on that handle of the collector which corresponds to the positive pole, as the operator desires it.

The characteristic of the positive pole is that it always belongs to the handle which is in motion, or which is at the highest figure : while the stationary handle, which is at zero, or at a figure lower than that which moves, belongs to the negative pole, according to the method of construction of Gaiffe.

(*e*) Commence slowly, very slowly, to turn on the cells, especially if it be the first operation undertaken, or if we should not be acquainted with the patient ; at first we go to 20 or 30 milliampères. Then proceed to 50 : by this time we gain the confidence of the patient, who will soon find out that the electricity does not cause much pain. Then reach 70, 80, or 100 milliampères, and it is better at this first sitting not to go beyond this figure.

(*f*) IT IS IMPORTANT NEVER TO MAKE THE PATIENT SUFFER TOO MUCH, AND NEVER TO INFLICT MORE PAIN THAN IS BEARABLE. THIS IS THE TRUE CRITERION WHICH SHOULD FIX THE LIMIT OF THE DOSE. It will, of course, vary with each patient and each disease, but the success of the operation depends on adhering to this rule. That is why we should apply the current at the beginning slowly and progressively in fractional doses, and then be guided by the replies of the patient in order to gauge what she is capable of supporting.

THE SECOND STAGE.

(*a*) Generally a few seconds suffice to apply to the uterus in an ordinary operation the maximum dose desired, but with very nervous or very hysterical women, and especially when we operate for the first time, we must take care to wait a minute or so to judge the maximum dose which they can bear.

(*b*) The point which we can reach will generally be 100 milliampères at the first sitting ; during the others we may try to raise it to 150, and even 200. The maximum figure once obtained—which differs, I repeat, according to the patient—keep it at the same level on an average duration of five minutes.

(*c*) All women do not support electricity equally well, and, besides, each requires a different intensity, according to the gravity and previous duration of the disease. Thus it is advisable, in a difficult case of severe hæmorrhage with marked fungous endometritis, to prolong the application to the maximum possible point of toleration, which might be as much as ten minutes ; with other persons, on the contrary, very hysterical and nervous, and easily enervated by the slightest pain, a sitting of three or four minutes will be as much as they can bear.

(*d*) All the intra-uterine portion of the sound is always applied against the uterine wall, so as to put it successively in contact with each part of it, anterior, posterior, and lateral, in order to disseminate and equalize, in this manner, its caustic action.

In patients with very resisting skin the deviation of the needle is greater, owing to the increased electric intensity or outflow, the current passing better through the moistened epidermis. The needle then generally becomes stationary, or moves at least but slightly, thus proving that the current, once well established, circulates in an almost continuous and identical manner.

THE LAST STAGE.

We must stop gradually, and never suddenly, in order to avoid a shock and painful contraction of the uterus or abdominal wall.

If the woman bear the current without complaining, the duration, according

to the therapeutical object in view, should be from five to eight minutes, and even ten minutes. If she do not tolerate it, but complains loudly, threatens to move, and becomes agitated, we must stop. If the patient complain at the first sitting, the dose must be diminished at once. The woman's feelings and genuine complaints must always be respected. There is generally more toleration during the second sitting.

If the same intolerance is manifested at the following sitting, we may suspect a *peri-uterine cellulitis* which had been overlooked; or it may be that an extraordinary uterine susceptibility, as in certain cases of hysteria, may compel us to stop at a dose of 30 or 50 milliampères.

The sound has to be very gently withdrawn. The abdomen is cleansed and dried. The vagina is washed out with an antiseptic solution, and tamponned with iodoform wool.

After-Treatment.

The after-treatment is most important. All movement should be prohibited. The patient should lie down at full length during a time varying from one to several hours. The nature of the uterine colic that often supervenes should be explained to her. A sanguineous or seropurulent discharge may follow. This is treated by vaginal antiseptic douching.

It is *better to suspend all conjugal relations* during the treatment. If there be pain, the abdomen may be fomented with an anodyal fomentation, and spongiopiline or a poultice applied.

Galvano-puncture Method. — The details of the galvano-puncture treatment I also take from Apostoli's own direction (see his introduction to Bigelow's work). Much, however, that has been said of the necessary details in the technique of intra-uterine galvano-caustic applications bears also on the step of vaginal galvano-puncture.

1. Galvano-puncture in vaginal fluctuating tumours.

A perfect antiseptic irrigation should precede and follow each application. Pack the vagina between the periods with gauze (iodoform, salol, or sublimate). Sexual intercourse should be entirely suspended during the treatment.

The patient should stay in bed one or two days after each puncture.

The steel trocar should be the smallest possible. It should pierce without effort.

One-half to one centimètre on the average will be sufficient to open a way for the current into the region which it should traverse. Deep punctures are dangerous.

Position of Puncture.—The lateral regions, and, above all, the posterior cul-de-sac, are favourable places, carrying the axis of the trocar towards the uterus in order to avoid the rectum.

Anæsthetic.—If made with high intensity chloroform should be used, though certain women support all forms of galvanic treatment without it.

Speculum.—Use no speculum. First fix in the celluloid sheath the needle to the depth of the puncture to be made; then, having ascertained with the

index-finger that there is no arterial pulsation, allow it to rest upon the point to be pierced; then slide underneath this finger the celluloid sheath which is to carry the trocar until its open mouth shall rest upon the exact spot; then push the trocar home, its penetrating depth having been properly adjusted.

'The number of punctures varies. One puncture is sufficient in some cases of hydro-salpingitis or of catarrhal salpingitis; others demand three or four, and tubercular salpingitis a greater number still. A longer rest in bed is demanded than in the other forms of application, and the second *séance* should not follow until all the excitability following the first has subsided.

'In regard to intensity and choice of poles, the first dose will vary from 20 to 50 milliampères. To go beyond this without anæsthesia is risky. When a current of 100 to 250 milliampères is demanded for creating a temporary vaginal fistula, chloroform should always be used.

'The puncture should generally be positive at the commencement, because it is less painful and causes less inflammation. The negative may be used when we seek to create a vaginal fistula to drain a fluctuating tumour, pointing into the vagina, or when, after having used the positive, we need the peculiar effects of the negative pole.

'If high temperature supervene, all electrical treatment must be suspended. A deep puncture of a pyo-salpinx may cause the opening of a purulent cavity into the peritoneum.'

2. Galvano-puncture in fibroid tumours.

SUMMARY OF DIRECTIONS AND PRECAUTIONS BY APOSTOLI.*

1. Absolute and regular antiseptic irrigation of the vagina, before and after each operation.

2. Use as the puncturing instrument a small steel trocar or needle, and let the punctures be shallow, not deeper than two or three centimètres.

3. Make the punctures in the most prominent part of the fibroid whenever possible in the posterior cul-de-sac.

4. Make the punctures without a speculum. Slide the trocar through the celluloid sheath which protects the vagina, after having examined and chosen by touch the point where the puncture is to be made.

5. Ascertain the seat of any pulsation, so as to avoid wounding an important vessel.

6. In case of any unusual hæmorrhage, *immediately dilate the vagina* with an expanding speculum, and if necessary put a pressure forceps on the bleeding-point.

I have thus briefly summarized the more important particulars of these methods of Apostoli in the application of electricity in certain morbid states of the uterus and its appendages. It only remains to make a few brief observations on the choice of *poles*.

THE POSITIVE POLE.—In the instance of fibroid tumours it

* Dublin meeting of the British Medical Association, 1887.

must be remembered that '*the positive pole is the express remedy for the cases attended with hæmorrhage, the negative pole when they are not hæmorrhagic.*

The positive pole is indicated in metritis and endometritis, in all forms of ulceration and hæmorrhage ; also in the subacute stage of perimetritis as an intra-uterine application, one or two sittings in the week, not more than 20 to 40 milliampères. The positive pole is recommended by Apostoli in the rebellious leucorrhœa of endometritis. In membranous dysmenorrhœa the positive pole is indicated. Positive puncture is advised in the first instance in a fluctuating tumour.

The Negative Pole is used in non-hæmorrhagic cases of fibroid tumour, in the chronic stages of subacute perimetritis after the positive pole has been used, in the non-hæmorrhagic forms of chronic metritis and endometritis, in galvano-punctures, in pyo-salpinx combined with strict antiseptic precautions, for galvano-puncture of fibroid tumours, and in draining fluctuating vaginal tumours.

Apostoli is careful to point out that though the actions here referred to are commonly spoken of as 'electrolytic,' they are not so in reality. Buckmaster, in his prize essay, says (*Brooklyn Medical Journal*, November and December, 1888) : 'There is no more justification for the term as applied to the treatment of fibroid tumours than there is for the use of the expression for the application of the galvanic current for the relief of a sciatica . . . the decomposition that takes place at the poles and the changes that occur between them are those of atomic re-arrangement . . . it is "the only chemical change that takes place, so that the term electrolysis, used to indicate some peculiar disintegration that is not always present, is clearly misapplied." He thinks that the effect of the current on a fibroid may be attained through its action on the bloodvessels and absorbents, the muscular tissue, the nerves, the connective tissues and the cells directly. He lays special stress on the blanching effect on the tissues, through the contraction of the bloodvessels, and the cataphoric action through the transference of the fluids to the negative pole, about which they accumulate.'

P. S. Hayes, in a discussion on F. H. Martin's paper (from the *Journal of the American Medical Association*, *British Gynæcological Society's Journal*, 1889, p. 489), in referring to the relative effects of the two poles, remarks :

'The destruction of tissue around the positive pole is not nearly as great as that around the negative ; the oxygen is separated about the positive pole and the acids are liberated, and I find the eschar which follows essentially the one produced by the action of the strong mineral acids on albuminous tissue. On the other hand, if the negative pole be used, we find that the destruction of

tissue extends probably twice as far from the electrode. The appearance is entirely different, that from the negative pole looking very much as though it had been frozen, and the scar tissue which results from the use of the negative pole does not contract as firmly as does that which follows the positive, and it seems to me that this can be explained to a large extent by the chemical action which takes place along the electrode. There are two, and possibly three, factors present in this method of using electricity ; there is the physical effect, due, of course, to the liberation of the gases around the electrodes ; there is the chemical effect, due to the electrolysis or separation of the salts of the body into the acids at one pole and the alkalies at the other ; and then there is the physiological effect, which we do not understand as well as we do the chemical and physical effects. Whatever be the amount of chemical action which takes place around the pole—that is, in the uterus—an equivalent amount of chemical action takes place under the electrode that is placed on the abdomen ; and almost invariably it causes an irritation of the skin, and possibly a blister within the circumference of the electrode, so that on the second or third day it is difficult to use the electrode where it was first applied. That the electricity, as it passes through the tumour, affects the cell life is a question that has yet to be proven, and I think the determination of the matter can be considered almost entirely due to the peculiar chemical action which takes place around the electrode.'

Inglis Parsons considers that electrolysis takes place at both poles, and is most destructive at the positive ; that it does not occur in the intervening space traversed by the current ; that the only change in the vessels is a local hyperæmia ; that there is no muscular contraction in the uterus save at the make and break of contact ; that in all probability the 'transport of elements' has some effect on the living tissues through which it passes.

According to Martin, cases of intolerance range themselves under the three following heads :

'(1) Hysteria ; (2) Enteritis ; (3) Acute nephritis ; (4) Previous phlegmon, the most tolerant being the deep uterine and profusely hæmorrhagic. The duration of the *séance* should be from eight to ten minutes. The number of operations will depend on the result to be accomplished.'

Bi-Electrolysis.

Under the head of 'Bi-Electrolysis,' Foveau de Courmelles employs a form of medicinal electrolysis which is a bi-electrolysis. In the case of uterine fibroma, iodide of potassium is injected into the uterus, and its decomposition secured by the action of a metallic needle introduced through the abdominal wall. The needles are made of different metals, such as copper and zinc. It is thought that thus the drug and the diseased tissue react on each other through a liberation of their primitive chemical elements, the result being a chemical cauterization.

CHAPTER XLVIII.

MASSAGE.

In view of the importance of treatment by massage in various affections incidental to women, I determine to devote a few observations to it as a fitting conclusion to this work. As the name implies, massage by itself simply means (μάσσω) handling or manipulating. We have in massage, as in many other arts or seemingly new practices, an exemplification of the old adage, that 'there is nothing new under the sun,' for there can be no doubt that the ancient Greeks and Romans availed themselves of this plan of treatment, and, indeed, long before them the Chinese had skilled rubbers.

It is my object, in these few observations, to give my personal experience of the use of massage in the various affections for which I have employed it, and to emphasize some matters of importance to the practitioner who does not wish to become the purest empiric or charlatan, in adopting this potent plan of treatment.

Personal Experience of its Use.

That I have some considerable experience of massage will be inferred when I say that, attracted by the reported results of this treatment on the Continent and in America, I have for many years resorted to massage in certain cases of paralyzed and atrophied muscles, and chronically enlarged joints. In later years I have largely availed myself of massage in gynæcological practice, in various neurotic affections, in hysteria, in irritable spinal cases, in localized neuralgias, in painful ovarian states, in amenorrhœa and dysmenorrhœa, in 'uterine lameness,' and for those nomadic sufferers who wander almost aimlessly from physician to physician, 'seeking help and finding none'—women suffering from uterus on the brain. Abdominal massage, combined with gal-

vanism, has proved at my hands most valuable in cases of chronic costiveness, especially after dilatation of the sphincters. I have also tried massage successfully in painful functional affections of the globe of the eye; it has been most successfully employed by others in various effusions, and I have myself seen its value proved in the pain of iritis. I have used massage over the mastoid process with benefit in neuralgias of the external and middle ear, and in otitis intermittens.

In several instances of muscular weakness in throat and laryngeal cases, and in atonic dysphagia, I can testify to its usefulness. In many cases of corpulence in women, at or about the time of the menopause, it has greatly benefited them, and in sufferers from chronic rheumatism and rheumatic enlargements it is invaluable.

Years ago I myself unfortunately contracted a rheumatic state of both shoulder-joints, which caused me acute suffering, inability to dress myself, or to raise my arms without great pain. To show how crippled I was, I may mention that the college porter had to draw my gown over my shoulders before lecture, though a short time before I had sculled myself from Oxford to London in a little over three days. After exhausting remedies, orthodox and unorthodox, taking some pounds of salicylates, sucking hundreds of lemons, trying sundry embrocations, I completely cured myself by systematic massage of the joints, applied for twenty minutes twice daily. A short Turkish bath, taken in my own house (in the portable bath of Allen), preceded the nightly massage. The constant current from a Leclanché battery, ten and fifteen cells, was applied for five minutes after the massage.

Varieties of Massage.

I must here protest strongly against the arrant quackery, the rage at present, which is *called* massage, and against the itinerant humbugs who are termed masseuses or masseurs, now being palmed off in shoals on a gullible public as 'skilled rubbers,' many of whom earn much larger incomes than successful young medical men, and who are crassly ignorant of any intelligent application of massage.* As I have already said, this is not a special work entering into a detailed description of the different forms of massage known as 'effleurage,'

* I desire to express my obligation mainly to the classical text-book of Professor Michael Foster, in compiling the summary of the physiological results of the various experimental researches which bear on the effects of massage or gymnastic exercises. Also I have had, amongst other sources, special assistance from the excellent manual of Dr. Joseph Schreiber, of Vienna, translated by Dr. Walter Mendelson, of New York (Young Pentland, Edinburgh). Another admirable manual in the English language is the 'Practical Treatise,' by Dr. Douglas Graham, of Boston (Wood and Co., New York). (The greater part of this chapter appeared in the Transactions of the Gynæcological Society, 1889, from a paper read by the author.)

'pétrissage,' 'tapotement,' 'friction,' according to the direction and nature of the movements, whether light and more superficial, or deeper and stronger, or effected by percussion and digital pressure. Each variety of massage has its physiological effect on the muscles which are masséd, whether rubbed, kneaded, pinched, or flagellated.

By *effleurage* is meant a peculiar stroking movement made with the palm of the hand, centripetally, in the course of the veins and lymphatics, and in the direction of the muscular fibres.

By *pétrissage* is meant the deeper kneading of the muscles by a movement of combined rolling and pressing, the muscle being seized and squeezed, the movement being made in a centripetal direction.

By *friction* we understand a combined movement of the finger-ends of both hands, one being carried *across* the axis of the limb by repeated strokes, and the other *in* the axis of the limb.

By *tapotement* we imply the percussion of the muscle or limb with the finger-tips, or percussor, or with the back of the half-closed hand. Most masseuses rub with oil or vaseline or lanolin. This is advisable in some cases, though for my own part I prefer 'dry' massage, and I find patients like it better as a rule. With it, as Murrell points out, you have more muscular contraction, and the electrical currents are more readily developed in the tissues.

Physiological and Clinical Effects.

I cannot delay to analyze and compare the effects of these different kneadings, frictions, strokings, tappings or beatings. I must group these various methods of action under the general term massage, and even include with these manipulations certain flexions and extensions or movements that are of necessity often combined with them in practising massage. Yet the physiological fact must be remembered that the nature of the stimulus, *i.e.*, its character and mode of application, applied to a muscle, influences not alone the kinetic energy of the muscle, but also the force and distribution of the reflex

impulses ; we do not get the same results with stroking as we do with either vibration movement or *tapotement*. With deep kneading we have a different result from that obtained by both of the former acts.

I may summarize, albeit very imperfectly, the more important physiological effects of massage on muscle, nerve, vascular distribution and lymphatic supply.

Muscles.

The chemical and physical changes consequent upon stimulation of muscles and muscle action, which modern physiological research has established :

(*a*) Generation and discharge of carbonic acid.

(*b*) Absorption of oxygen.

(*c*) Creation of lactic acid and other chemical changes in the muscle.

(*d*) Probable slight increase in muscle temperature.

(*e*) Slight alteration in bulk of the muscle, attended by changes in the blood-supply, both in quantity and character.

(*f*) Generation of reflex impulses. With regard to this effect, it has to be remembered, as Foster remarks, that 'a muscle, even putting aside the visible terminations of the nerve, is fundamentally a muscle and a nerve besides.'

(*g*) Readier response to electrical stimuli after massage, and probable electrical changes ; during massage, excitation in the muscle-nerves excited.

(*h*) An influence on unstriated muscular peristalsis.

Nerves.

Chemico-physical molecular changes in the nerve-tissue starting both sensory and motor impulses ; these centripetal impulses affect the central ganglia, and influence both automatic and reflex actions. The phenomenon of inhibition is manifested. Analgesia is produced by prolonged and continued pressure.

The Vascular Mechanism.

The main effects are to be seen in the peripheral arterial resistance. The peripheral resistance is generally lessened (at times may be temporarily increased) by massage. This is principally due to the following effects : Altered nutrition of parts ; change in the peripheral vaso-motor control ; reflex stimulation of the vaso-motor centres ; altered blood-pressure due to the presence of carbonic acid and loss of oxygen (according to Sommerbrot,* intra-bronchial pressure taking an important part in this action on the heart). These effects are manifested in altered blood-pressure and arterial tension, primary diminution, secondary increase.

The heart's beat may be influenced by (*a*) the local reflex effects on the skin and muscle, or through the abdominal nerves, during abdominal massage, from splanchnic inhibitory action ; (*b*) by the alteration in the arterial pressure, either local or general, brought about by the massage. Such vascular changes

* Sommerbrot : 'Ueber eine bisher nicht gekannte wichtige Einrichtung des menschlichen Organismus.' Tübingen, 1884.

are necessarily attended by a local determination of blood, by alteration in the velocity of the blood current, in the metabolic tissue changes, in the nutrition of the parts massed, in the comparative rapidity of the removal of excrementitious material. More especially important are such physiological effects if manifested in the case of the portal and renal circulations.*

Lymphatics.

In deep massage of the extremities, or kneading, the centripetal flow of lymph in the tendon and fascia lymph vascular spaces is expedited. This will be the case also in the tendinous and fascial structures composing a great part of the abdominal wall; the processes of absorption and resorption are promoted; lymphatic glandular activity is excited. The same occurs in the more superficial lymph vessels from stroking the skin and vibration movements. During deep abdominal massage a powerful influence must be exerted on the lymphatic vascular mechanism and on the nature of the fluid in the lacteal vessels. This will result directly from the continued or intermittent mechanical pressure exerted through the abdominal wall, independently of the altered relations between the superficial and deep lymph currents and the blood-vessels. It must also follow from the effects of massage on the portal circulation. I allude to the more rapid reception by the portal blood of the products of digestion which find their way into it. This temporary increased diversion of food elements necessarily influences the chyle and the tension of the lacteal vessels. Also in general massage, followed by abdominal, through the continued suction effects of increased respiratory movements and general (primary) diminished venous pressure, the lymphatic flow is temporarily encouraged, while through the nervous influence on the abdominal vascular system generally, lymphatic absorption is promoted.

These physiological facts, necessarily modified by the local anatomical relationships, can be well applied to the pelvic structures in which gynæcologists are more especially interested.

We may correlate such physiological effects of massage with the more manifest clinical phenomena and effects noticed in its practice.

I arrange these latter in tabular form.

(1) Slight immediate changes in body temperature. These are not constant, and vary, with rare exceptions, to the extent of a degree more or less; of this I have satisfied myself several times. There is occasionally a fall; this is not so common as a slight rise.

(2) Decided increase, as a rule, in muscle nutrition and power of endurance; increase of muscle weight.

(3) Restoration of reflex excitability in weakened muscles, and the improved association of reflex and automatic action

* See Schreiber's 'Manual of Treatment by Massage,' translated by W. Mendelson, M.D., of New York.

(4) Reduction of cutaneous and muscular hyperæsthesia, and relief of pain arising from reflected irritations in distant regions.

(5) Increased effects of galvanism when used after massage necessitating reduction in the strength of the current, and increased care in its employment.

(6) Improved peristaltic action, as shown in the case of the non-striated abdominal muscles of the intestines and the œsophageal muscles.

(7) Results of improved nutritive nerve changes, as we find in the case of muscle. These are shown in restored nerve function, in healthier brain action, in the production of sleep, in alleviation of perverted and distorted mental symptoms.

(8) The improvement in the tone and character of the pulse under massage treatment. This good influence on a sluggish circulation is exhibited in the effect on cold extremities; the same result is seen in cases of rhythmic irregularity of heart, due to torpid hepatic circulation, flatus, and abdominal obesity. The occasional attack of syncope, which I have seen in a few instances, is the effect of either a reflex inhibitory stoppage of the heart's beat, or a syncope arising from rapidly lowered arterial pressure. In one patient, vascular and nervous excitement were so pronounced every time head massage was tried that I had to abandon it. This was shown in suffusion of the face and eyes, sense of weight in the head, great mental excitement, hysterical crying; these symptoms were followed by corresponding mental depression.

(9) Absorption of fat* and loss of weight due to removal of excrementitious material and useless fat, with improved digestive

* W. S. McKee (*New England Medical Monthly*, November, 1891), commenting upon the frequent association of obesity and menstrual disorders, makes the following generalizations:

Obese women usually have scanty menstruation, the periods being irregular and usually accompanied by sacral pains; they are very liable to abort, or if they go to term, to produce offspring deficient in vitality; they are very frequently sterile, and in such the sterility has been cured by abdominal massage, purgation, and a strict dietary.

powers. Such therapeutic use of massage must be continued, with the enforcement of dietetic rules, and avoidance of fat-forming food.

Urine.—Interesting in connection with this loss of fat is the analysis of a patient's urine—that passed immediately previous to an hour and a quarter's massage, and that passed immediately after the rubbing. The lady had lost nine and a half pounds in less than a month.

		Samples of Urine.	
		Before Massage.	After Massage.
Reaction ...	...	Acidulous.	Acidulous.
Total Solids ...	... p.c.	5·90	6·55
,, Urea ...	... ,,	2·40	3·05
,, Uric acid ...	... ,,	·03	·06
,, Acidity ...	... ,,	·43	·51
,, Chlorine as chlorides ...	,,	·52	·37
,, Sulphuric as sulphate ...	,,	·12	·15
,, Earthy salts ...	,,	·31	·34
,, Alkaline ...	... ,,	1·00	1·10
Specific gravity of sample ...	,,	1021	1023

(10) Reabsorption of lymph effusions and various exudations; reduction of glandular hyperplasias.

While thus enumerating the physiological and clinical effects of massage, as experienced under favourable conditions of temperament and physique, and aided frequently by other therapeutical means—such as galvanism or faradism, baths, medicinal agents, special dietary—it must be stated that the process is frequently attended by various exaggerated or unexpected results in some or all of the directions enumerated which completely contra-indicate its employment. *Certainly it is not a course to be prescribed or recommended in a careless or cursory manner.*

Once for all, let me say that the massage I am speaking of is *not* '*vicarious exercise.*' It is not because exercise and massage have some points in common that they are ignorantly to be spoken of as substitutes the one for the other. It is somewhat of the crow and blackbird relationship. Massage in some of its methods is a form of exercise, but exercise is not massage. *Manual massage differs widely from exercise,* gymnastic or other, in (*a*) the nature of the excitation; (*b*) the

power of its limitation to defined areas; (*c*) the direct action on the bloodvessels, lymphatics and nerves; (*d*) the comparatively slight evolution of body heat; (*e*) the passive attitude of the subject; (*f*) the absence of the more complex actions of a reflex and automatic nature, with the associated cerebral inhibitory supervision, which are the necessary attendants on exercise. The more complicated, or the more finely adjusted, such exercises, the more widely do they depart in their nature from the manipulation of massage. We might as well compare the necessary manipulations and the physical labour or fatigue of the masseuse with the effects on the person masséd.

Use in Gynæcology.

(1) Atonic conditions generally, both of muscles and nerves, as, for instance, relaxed abdominal walls; intestinal flatulent distension; chronic tympanitic states; chronic constipation; those forms of general debility and lassitude complicating menorrhagia, subinvolution, and other chronic uterine affections.

(2) In reflex neuroses arising from or complicating morbid states of the generative organs in women; so-called cases of irritable spine; reflex headache; cases of 'uterine lameness': neuro-mimesis of joints, torticollis.

(3) In amenorrhœa and dysmenorrhœa, especially those cases associated with anæmia and chloræmia.

(4) In neuralgias of the pelvic nerves—oöphoria, neurasthenic coccygodynia.

(5) In unhealthy fat accumulation.

(6) In masturbators.

(7) In that numerous class of female patients in whom there is no organic disease, and who are generally grouped as the victims of hysteria, neurasthenia, or hypochondria.

(8) Glandular hyperplasia.

(9) Mammary infiltrations, in chronic mammary hardening, in threatened milk coagulation, in mammary neuralgia.

I recently had a case of aggravated neurasthenic torticollis

It had resisted other remedies. It yielded completely to a combined course of massage, the galvanic current, and subcutaneous injections of cocaine into the sterno-mastoid. The bromide and phosphide of zinc were taken internally.

Here I may casually refer in passing to the good results I have seen in chronic constipation from abdominal massage. I allude particularly to cases of fæcal accumulation. I believe the proper treatment for the more obstinate of such cases to be dilatation of the sphincters and emptying of the rectum, followed by galvanism and deep massage of the abdomen. A course of belladonna and nux vomica should accompany the massage.

Combined Internal and External Massage.

I have here purposely included only those affections in which I have had ample personal proofs of the benefit of massage. I do not in any remarks I make refer to combined internal and external massage, of which there are as many kinds as there are methods of gynæcological examination. It is needless to insist on the care which is necessary in carrying out such a plan of treatment. How far a licensed abuse of this practice might be carried we need not discuss. How far the possible advantages may be overbalanced by the certain evils it is not difficult to surmise.*

I know nothing, personally, of the value of this latter form of massage in metritis, ovarian tumour, perimetritis, cystitis and uterine tumours, and not having tried its efficacy, I do not wish to express any opinion on the results of this treatment in the hands of those who have.

Massage in Descent and Prolapse of the Uterus.

Massage and pelvic gymnastics have been practised by Brandt of Stockholm, Schauta, and others. It consists, briefly, of (1) elevation of the uterus by a plan of combined internal and external manipulation, followed by (2) massage of the

* That the truth of this statement should be brought so prominently before the profession and the public as it has been of late I did not contemplate when I wrote this in 1889.

uterus and its ligaments, principally by *external* movements in the direction of the internal os from the fundus, the uterus being supported against the abdominal wall by the assistant's finger in the vagina. These uterine movements, etc., are followed by (3) pelvic gymnastics, the patient's thighs, as she lies in the lithotomy position, being forcibly abducted, while she resists, at the same time that she raises the sacrum from the couch, and supports herself on the elbows and feet. Lastly, (4) tapotement of the lumbar and sacral vertebræ is practised with the clenched fist. In the six cases in which this treatment was tried, the permanent successful results are only recorded in two; on the whole the writer speaks favourably of it. Alfred Smith devised a uterine elevator which the patient can herself use to raise the uterus, and thus avoid the necessity for an assistant's fingers in the vagina. (See paper by Alfred Smith, 'Transactions of the Academy of Medicine in Ireland,' 1889.)

Dangers of Massage.—It would seem superfluous to speak of the dangers attending the use of massage in perimetritis, and the risks of an uncertainty of diagnosis in these affections, both as to the situation and character of effusions, but in works on massage its employment is advised by various authorities in these conditions. One thing appears certain, that the responsibility of administering it in acute pelvic cellular or peritoneal inflammations should rest with no one save a qualified medical manipulator. Even in cases of chronic lymph or serous exudations in the pelvis, I maintain that no nurse should be entrusted with the administration of massage, and no one should advise it save a physician, and one well versed in such diseases.

I have known patients who were 'rubbed' for the consequences of fibroid tumour and ovarian cyst. The kinetic energy here might have been more safely expended on the lady's boots. Not long since I had a patient with contracted vulvar orifice, lupoid degeneration of the vaginal wall, and uterine hæmorrhage. She consulted me for the hæmorrhage. This was stopped after a little time, and I left. The next I learned of her was that she was being 'rubbed.' A lady friend recommended it, and a doctor sent the masseuse. She was being 'cured.' The last thing I heard of her was that she was dangerously ill, and under the care of the doctor who sent the masseuse. I have reason to believe that at the time he never locally examined the case. She has since died. *This*

is the abuse of massage—the vulgar empiricism that I complain of.

Weir-Mitchell's Method.

I have had too many proofs of the efficacy of the Weir-Mitchell* plan in cases of my own to deny its great use in certain cases. I do, however, mean emphatically to give it as my opinion that discrimination and care are required, both when recommending it and in carrying the treatment out. To fatten women up, and especially young girls, somewhat as a Bey of Morocco would do (in subdued light, and on the flesh of ortolans), only substituting the æsthetic surroundings of a West-End bedroom or boudoir for the seraglio, milk diet for the food of the luscious bird, and massage for a species of 'lomi-lomi,' is not always so permanently conducive to health of mind and body as we are led to believe. In one particular case I am cognisant of, such a course was attended by disastrous mental results—the patient narrowly escaped confinement in a lunatic asylum.

The enforced stuffing and isolation in some 'medical home,' entailed in this modern method of making blood and fat, are hardly the therapeutic means to blindly bargain about beforehand. Indeed, all such bargaining is to be deprecated on many grounds, not the least important being the necessity, growing stronger from year to year, for those who are the leaders of medical practice to have clean hands in regard to all such commercial relations with their patients. I say that while such isolation and mechanical management may answer in a certain proportion of cases, it cannot but be followed by injurious results in others, while in many the improvement, at best, is but of a transitory character. Let me, however, cite, in proof of the benefit of the Weir-Mitchell system, the outlines of one remarkable case:

A young lady, of highly nervous temperament, consulted me for œsophageal and spasmodic strieture; she suffered from dysmenorrhœa, and there was a

* See pp. 181-183 for details of Weir-Mitchell's method.

LEEDS & WEST RIDING

MED.-CHIRURGICAL SOCIETY

slight degree of retroversion. She was greatly reduced. The retroversion was restored. Still the difficulty of swallowing continued, notwithstanding active local treatment, œsophageal galvanism, internally and externally, the passage of the bougie and various remedies in the shape of nerve tonics, bromides, etc. Ultimately she recovered sufficiently to enjoy food and revert to her ordinary duties. Some months subsequently she returned worse than ever. She was greatly emaciated, and could with difficulty swallow even a teaspoonful of fluid; the swallowing of any liquid was attended by a loud gurgling. An atonic state of the muscular fibres resulted in a pouch-like dilatation of the gullet, in which blood collected, and from which it regurgitated. The skin was dusky and the face pinched. Altogether, her state was most wretched. Still, I could pass, with a little difficulty, a large œsophageal bougie into the stomach. Suffice it to say that with a six weeks' course of Weir-Mitchell's plan, combined with massage of the neck muscles and external galvanism, this patient was perfectly, and I believe permanently, restored to health. She was isolated from friends for a period of about five weeks.

I wish that everyone would 'read, learn, and inwardly digest' these sound and valuable comments of Goodell with regard to that numerous class of women sufferers who, when they come complaining of various troubles, some fleeting, some intangible, some fanciful, others permanent, others visible, and many in no sense exaggerated, are immediately pounced upon as victims to some disorder of the generative organs and functions. They are worthy of the robust mind of that practical and distinguished American gynæcologist:

'I have learned to unlearn the idea—and this was the hardest task of all—that uterine symptoms are not always present in cases of uterine disease, or that, when present, they necessarily come from the uterine disease. The nerves are mighty mimics, the greatest of mimics, and cheat us by their realistic personations of organic disease, and especially of uterine disease. Hence it is that seemingly urgent uterine symptoms may be merely nerve-counterfeits of uterine disease. I have, therefore, long since given up the belief, which with many amounts to a creed, that the womb is at the bottom of nearly every female ailment.

'Nerve-strain, or nerve-exhaustion, comes largely from the frets, the griefs, the worries, the carks and cares of life. Yet although the imagination undoubtedly affects it, it is not a mere whim or an imaginary disease, as all healthy women and most physicians think; but it is the veriest of realities. When some flippant talker or some slipshod thinker scoffs at nervousness as a sham disorder, I say to him: "Can the bribe of a principality keep you from blushing when you are ashamed, or from blanching when you are afraid? Under the fitting sense of shame or fear, these vaso-motor disturbances are momentarily beyond your control; and so they are in the nervous woman, whose vital organs are, as it were—not transiently, but—perpetually blushing and blanching under deficient brain-control over the lower nerve-centres."

'Strangely enough, the most common symptoms of nerve-disorder in women are the very ones which lay tradition and empiricism attribute to womb-disease. They are, in the order of their frequency, great weariness, and more or less of nervousness and wakefulness; inability to walk any distance, and a bearing-down feeling; headache, napeache, and backache; scant, painful, delayed, or suppressed menstruation; cold feet, and an irritable bladder; general spinal and pelvic soreness, and pain in one ovary (usually the left), or in both ovaries. The sense of exhaustion is a remarkable one; the woman is always tired; she passes the day tired, she goes to bed tired, and she wakes up tired—often, indeed, more tired than when she fell asleep.

'She sighs a great deal, she has low spirits, and her arms and legs become numb so frequently that she fears palsy or paralysis. There are many other symptoms of nerve-strain, but since they are not so distinctly uterine, and therefore not so misleading, I shall not enumerate them.

'Now, let a nervous woman with some of the foregoing group of symptoms recount them to a female friend, and she will be told that she has a womb-disease. Let her consult a physician, and ten to one he will think the same thing, and diligently hunt for some uterine lesion. If one be found, no matter how trifling, he will attach to it undue importance, and treat it heroically as the peccant organ. If no visible disease of the sexual organs be discoverable, he will lay the blame on the invisible endometrium or on the unseeable ovaries, and continue the local treatment. In any event, whatever the inlook or the outlook, a local treatment is bound to be the issue.'

Conclusions.

I maintain that it is the duty of the physician to superintend the administration of the massage, so far as constantly seeing its effects on his patients, and directing the kind of massage to be used, and the length of time it is to be practised. Also he should regulate the diet, hours of rest, quantity of exercise, amount and character of amusement, times of bathing, and see that the intellectual side of his patient's nature is not wholly neglected for her physical. Massage by no means agrees with all for whom we may feel disposed to recommend it.

I would advise all medical men, in determining to make use of massage—

1. To study for themselves the various kinds of massage, and the physiological effects of each form.
2. To select, after careful personal inquiry and questioning, their own masseuse, who must be an intelligent, cheerful woman, with exceptional tact and decision of character.
3. To see that she has some elementary knowledge of anatomy and physiology, and the position of the muscles and bones.

4. To regulate and superintend the kind and the times of massage; the intervals of rest, exercise, and the dietary.
5. If pursuing the Weir-Mitchell plan of rest, feeding, and seclusion, to watch its effects on the patient, and not to blindly adopt this method of treatment without careful supervision, trusting neither to nurse nor interested home proprietress to carry it out.

   Also to endeavour to have a modified system of massage (so far as is possible) persevered in for some time after the patient is removed home.
6. To begin in most cases with general massage of the extremities, trunk, and back-muscles, gradually practising abdominal massage. This rule, of course, does not apply to those cases in which abdominal massage is especially indicated.
7. Not to use massage immediately before or after meals. Some light nourishment may be taken previous to the rubbing. The patient should generally rest for an hour, and, if she sleep, should not be disturbed. When she wakes she may be given a seaweed bath, and be well rubbed down. Then she should have her drive or light exercise.
8. The best time for massage is in the morning. I prefer the hour of eleven a.m. The duration of the séance will depend on the nature of the case. I find half an hour's effleurage generally ample. Two or three short séances in the day are better than one prolonged massage.
9. The practitioner will find that much of the success of his treatment will depend on the type of woman he selects for his cases. She requires strength of body as well as of will, while with these there must be combined gentleness and patience. She must be a woman calculated to inspire hope and confidence, and, above all, reticent in speaking of other patients or their ailments.

CHAPTER XLIX.

A FEW OF THE PRINCIPAL FOREIGN AND HOME SPAS.

PRACTITIONERS are often consulted as to the class of spa to which a patient should be sent. This list will be found convenient for ready reference, and from it a final selection may be made.

The author by no means intends this list as a complete one.

(*The nature of the water is roughly given, and the situation.*)

PELVIC AFFECTIONS OF WOMEN.

NAME.	CHARACTER OF WATER.	SITUATION.
Adelheidsquelle ...	Salts, with iodine and bromide	Bavaria.
Barèges	Sulphurous	Hautes-Pyrénées.
Bagnères de Bigorre	Ferruginous; arsenical ...	,, ,,
Bourboule, La ...	Highly arsenical	Puy-de-Dôme.
*Brides-les-Bains ...	Alkaline	Savoy.
*Carlsbad	,, ...	Bohemia.
Carlsbrunn	Ferruginous (effervescing) ...	Silesia.
Eaux-Chaudes ...	Sulphurets with chlorides ...	Basses-Pyrénées.
Ems	Alkaline	Duchy of Nassau.
Les Escaldas ...	Sulphurous, etc.	Pyrénées-Orientales.
*Franzensbad ...	Ferruginous; alkaline ...	Bohemia.
*Wilbad-Gastein ...	Electrical	Duchy of Salzburg.
*Kissingen	Saline (chlorides)	Bavaria.
*Kreuznach† ...	Saline; strongly iodized; mud baths	Rhenish Prussia.
*Marienbad	Ferruginous and alkaline ...	Austro-Hungary.
Nenndorf	Sulphates and saline	North-west Germany.
*Plombières	Various; ferruginous	Vosges.
Pyrmont	Ferruginous; brine baths, etc.	Waldeck-Pyrmont.
*Royat	Arsenical and iron	Puy-de-Dôme, France.
Salins-Moutiers ...	Various; ferruginous, chlorides, and iodides	Savoy.
*Schwalbach	Ferruginous	Hesen-Nassau.
*Spa	,, ...	Belgium.
Uriage	Saline; sulphurous	Isère, France.
*Woodhall	Bromine and iodine	Lincolnshire.

* Those Spas marked with an asterisk are ones which the author can most strongly recommend in affections of the pelvic organs of women.

† I believe that the Woodhall Spa water is in every respect equal to Kreuznach, and is a more powerful bromated spa. Also the climate is not so enervating as that of the German resort. I have sent a large number of patients to Woodhall, and can testify most emphatically to the benefit the majority have derived from the course there. Dr. Williams, the energetic local medical adviser of the Spa, gives me the same general report of the value of the treatment in uterine and pelvic affections of women. My experience ranges over several years. In the early stages of fibroma, in perimetric effusions, in subinvolution, I have found in the majority of cases a decided improvement, and permanent arrest in several.

SPAS (*continued*).

Anæmic States.

NAME.	CHARACTER OF WATER.	SITUATION.
Bagnères de Bigorre	Ferruginous and arsenical ...	Hautes-Pyrénées.
Bath	Ferruginous	Somersetshire.
Biarritz	Sea-air (winter)	Basses-Pyrénées.
Cannes	Sea-air	Maritime Alps.
Carlsbrunn	Ferruginous	Silesia.
Châtel-Gyon	Chlorurets of sodium and magnesium, and ferruginous ...	Puy-de-Dôme.
Felixstowe	Ferruginous	Suffolk.
Franzensbad	Alkaline ; ferruginous	Bohemia.
Levico	Ferruginous and arsenical ...	Trentino, Austria.
Marienbad	Ferruginous and saline ..	Austro-Hungary.
Plombières	Various ; ferruginous	Vosges.
Pyrmont	Ferruginous	Waldeck.
Rippoldsau	Saline ; chalybeate	Black Forest.
Royat	Arsenical and iron	Puy-de-Dôme, France (1,480 feet).
Schwalbach	Ferruginous	Nassau.
Spa	,, ...	Belgium.
Stahlbrunnen of Homburg	,, ...	Central Germany.
St. Malo	Sea-air	Ile-et-Vilaine, France.
St. Raphael	,, ...	Var, France.
Tunbridge Wells ...	Ferruginous	Kent.
Vals	,, ...	Ardèche, France.

Glandular Organs (Strumous Affections).

Ashby-de-la-Zouch ...	Saline	Leicestershire.
Eaux-Bonnes ...	Alkaline sulphates	Basses-Pyrénées.
Eaux-Chaudes ...	Sulphurets ; chlorides	,, ,,
Ischl	Sulphurous	Austria.
Kreuznach*	Bromine and iodine	Rhenish Prussia.
Leamington	Chlorides	Warwickshire.
Leuk	Sulphates, etc.	Switzerland.
Lichtenthal	Ferruginous	Baden.
Marienbad	Alkaline	Austro-Hungary.
Reichenhall	Saline	Upper Bavaria.
Sankt Moritz	Alkaline	Switzerland.
Tarasp	,, ...	,,
Weston-super-Mare ...	Sea-air	Somersetshire.
Woodhall Spa ...	Bromine and iodine	Lincolnshire.

Defective Biliary Metabolism and Gout.

NAME.	CHARACTER OF WATER.	SITUATION.
Aix-les-Bains... ...	Sulphurous	Savoy.
Aix-la-Chapelle ...	Alkaline and sulphates ...	Rhenish Prussia.
Baden-Baden ...	Alkaline ; chloride of sodium	Duchy of Baden, Germany.
Bath	Alkaline and sulphates ...	Somersetshire.
Bilin	Alkaline (carbonates)	Bohemia.
Bourboulc, La ...	Arsenical, etc.	Puy-de-Dôme, France.
Brides-les-Bains ...	Alkaline	Savoy.
Buxton	Various spas	Derbyshire.
Carlsbad	Alkaline ; soda salts	Bohemia.
Cheltenham	Various spas	Gloucestershire.
Contrexéville	Alkaline	Vosges.
Ems	,, ...	Germany.
Harrogate	Sulphur ; iron ; saline ...	Yorkshire.
Homburg	Alkaline, with iron and sulphur	Central Germany.
Kissingen	Saline (chlorides)	Bavaria.
Leamington	Alkaline	Warwickshire.
Lisdoonvarna ...	Sulphur, etc.	Co. Clare, Ireland.
Llandrindod Wells ...	,, ...	Brecknocksh., Wales.
Malvern	Brine and saline baths ...	Worcestershire.
Marienbad	Saline (with iron)	Bohemia.
Nauheim	Saline (chloride of sodium) ...	Hessen-Nassau.
Pougues	Alkaline and ferruginous ...	Nièvre, France.
Strathpeffer	Sulphur and sulphates, etc. ..	Ross-shire.
Vals	Alkaline and alkaline earth (bicarbonates) ; various spas	Ardèche, France.
Vichy	Alkaline and alkaline earth (bicarbonates) ; various spas	Central France.
Vittel	Various salts (sulphates and bicarbonates of lime and magnesia ; iron, and manganese)	Vosges.
Wiesbaden	Saline (chlorides)	Nassau.
Wilbad	Electrical baths	Black Forest.

Affections of the Urinary Organs.

Baden-Baden ...	Chloride of sodium (arsenic and lithium)	Duchy of Baden.
Bilin	Saline	Bohemia.
Buxton	Various; carbonate of lime ; iron	Derbyshire.
Carlottenbrunnen ...	Chalybeate	Silesia (whey cure).
Carlsbad	Alkaline ; soda salts	Bohemia.
Contrexéville	Alkaline	Vosges, France.
Ems	,, ...	Nassau.

AFFECTIONS OF THE URINARY ORGANS (*continued*).

NAME.	CHARACTER OF WATER.	SITUATION.
Harrogate	Various sulphur spas ; also iron and saline	Yorkshire.
Homburg	Alkaline, with iron and sulphur	Central Germany.
Kissingen	Saline (chlorides)	Bavaria.
Mannheim	Saline	Central Germany.
Marienbad	Alkaline and ferruginous ...	Bohemia.
Montecatini	Saline, various	Lucca, Italy.
Neuenahr	Alkaline	Rhenish Prussia.
Vals	Alkaline and alkaline earth (bi-carbonates) ; various spas ...	Ardèche, France.
Vichy	Alkaline and alkaline earth (bi-carbonates) ; various spas ...	Allier, France.
Vittel	Various salts (Grande Source)	Vosges, France.
Wildungen	Alkaline	Waldeck.

AFFECTIONS OF THE NERVOUS SYSTEM.

Corfu	Sea-coast	Ionian Islands.
Ems	Alkaline ; muriatic	Duchy of Nassau.
Wilbad-Gastein ...	Electrical	Duchy of Salzburg.
Levico	Ferruginous ; arsenical ...	Trentino, Austria.
Marienbad	Ferruginous ; alkaline	Austro-Hungary.
Nauheim	Saline and ferruginous ...	Hessen-Nassau.
Plombières	Various ; gas baths	Vosges.
Rippoldsau	Saline effervescent ; chalybeate	Black Forest.
Ragatz	... ...	France.
Salins	Various	Savoy.
St. Sauveur	... ...	France.
Teplitz-Schönau ...	Alkaline and saline	Austria.

APPENDIX.

LE BEC'S METHOD OF PAN-HYSTERECTOMY FOR FIBROMATA.

At the annual meeting of the British Medical Association, 1896, Le Bec, of Paris, described an operation performed by him, the steps of which somewhat vary from those detailed in the text (pp. 435-498, and 546-560). They are as follows:

The tumour having been turned out through the incision, and the annexa raised and stretched, two ligatures are placed, one ligating the ovarian vessels on the outer side of the ovary, and the other the Fallopian tube at the inner side of the ovary. The broad ligament is cut between the two. The round ligaments are then separately tied, and the bladder is carefully separated from the anterior surface of the tumour as far as the cervix. In order to complete this detachment of the bladder, the peritoneum is incised on the anterior surface of the fibroma so as to form a peritoneal flap. Care is taken to avoid the ureters by pushing the bladder downwards and forwards, and, if the tumour be very large, the greater part is removed above a temporary elastic ligature, the peritoneal flaps being left. The next step of the operation is the incision of the anterior and posterior fornices of the vagina to the extent of from 2 to 3 centimetres. This is done on a long forceps inserted into the vagina, so as to stretch the fornix, and on it the vaginal roof behind and in front is incised, the incision being enlarged by opening the blades of the forceps to the extent of 5 or 6 centimetres. By means of the same forceps passed through the vagina and pouch of Douglas into the abdomen, one end of a silk thread 40 centimetres in length is seized, drawn into the vagina through the posterior aperture, and is carried back into the abdomen through the opening in the anterior fornix. The loop thus formed between the vagina and abdomen includes all the vessels of the broad ligament at one side of the uterus, which are thus ligated. The same plan is pursued on the opposite side. Nothing now remains but the pedicle of the tumour, which is extirpated by dividing it in the middle line, and cutting away as much as possible of the two halves, taking care not to encroach on the lateral ligatures. The latter are now seized by the forceps, passed through the vagina, and by this means both halves of the pedicle are drawn down into it. The peritoneal flaps removed from the fibroma, anteriorly and posteriorly, are now sutured with catgut, and the abdomen is closed. The vagina is thoroughly cleansed, and a drainage-tube inserted into it for washing-out purposes. The pedicle ligatures are brought away on the fifteenth day. Le Bec in all uncomplicated cases closes the pelvic peritoneum; not so, however, when there has been any serious trouble of the annexa or extensive adhesions, in which cases he drains through the pouch of Douglas for forty-eight hours. He finds this method specially advantageous in certain cases of fibroma with cancer, when vaginal hysterectomy cannot be performed, and in fibroma complicated with salpingitis. The early and complete ligation of the vessels offers special advantages, and there is but little hæmorrhage. Out of forty cases he operated on he lost four.

INDEX.

For all names of authorities quoted refer to 'Index of Names,' p. 900.
In the 'List of Appliances' at the end of the book the reader will readily find any instrument required.

ABDOMEN:
examination of, 82-87
palpation of, 82
paunched, 647
phantom tumour of, 51
shape of, 82
skin of, 82
Abdominal regions, 82
Abortion, 41, 51, 223, 324, 373
cause of endometritis, 324
pelvic hæmatocele, 373
perimetritis, 351
caused by uterine sound, 64, 160
Abscess:
in urethro-vaginal septum, 763
of vulvo-vaginal glands, 3, 750
of kidney, 807
ovarian, 608
parametritis, 368
pelvic, 138, 608
perimetritis, 352-354
Accidents due to anæsthesia, 71
during operations for cancer, 552, 553
following intra-uterine injections, 126
Adenoma of uterus, 512
Age in diagnosis, 38
Alexander's operation, 236
Mundé's modification of, 239
Amenorrhœa, 139, 147
causes, 148
classification of, 147
diagnosis, 148
galvanism in, 157
general hygienic rules, 153-156
medicines indicated in, 156
primary, 147
secondary, 147
treatment, 153
Amenorrhœa (*continued*)
varieties of, 147
wines in, 160
Amputation of cervix uteri:
for cancer, 280
for inversion, 295
Amputation of Fallopian tubes, 621
Anæmia and chlorosis, 42, 148, 151
Anæsthesia, local, 73, 120
by cocaine, 73
by hypnotic suggestion, 164
Anæsthetics in diagnosis, 68-73, 90
bichloride of methylene, 69
chloramyl, 68
chloroform, 69
Clover's inhaler, 70
cocaine, 73
dangers in, 71
ether, 69
Junker's inhaler, 70
nitrous oxide and ether, 68, 69
oxygen, 69
rules for, 69, 71
Angioma urethræ. See Urethra
Annexa, relative position of, 481, 482
Anteflexion, 208-221
causation, 209
diagnosis, 211
symptoms, 210
treatment, 212
Anteversion, 198-208
degrees of, 199
diagnosis, 199
treatment, 200
Antisepsis in operations, 76, 121, 218, 263, 416-420, 668, 716
Aperients, 157, 173, 460, 836
glycerine enemata and suppositories, 173
natural waters, 173, 836

Apoplexy of Fallopian tube, 577, 578
of the ovary, 604, 605
Appendages, tubercle of, in virgins, 584
Appendicitis, 32, 356-358
Appliances required for examination of a case, 38
Arsenic, 158
Ascent of uterus, 275
Ascites complicating ovarian tumours, 83, 648, 649, 652
differentiated from ovarian tumour, 557
Aspirating needle, 72
Aspirator:
in closure in vagina, 707
in diagnosis, 73, 89, 113
in hæmatocele, 121
in pelvic abscess, 353
in vaginal puncture, 121
Atresia:
of Fallopian tube, 841
of uterus, 700, 701, 704, 705
of vagina, 700, 702, 705
of vulva, 727
Attendant in study, 50
Auscultation in diagnosis, 51, 151

Bacilli, tubercular, 499
in cancer, 515, 517
in vagina, 726
Balottement, 83
Baths, 42
in amenorrhœa, 161
in dysmenorrhœa, 182
in endometritis, 322
in subinvolution, 331
in vaginitis and vulvitis, 739
Batteries, 175, 176
Bed or couch, 43
Bi-electrolysis, 865
Bimanual examination, 86, 87
in anteversion and anteflexion, 211
in inversion, 87
in retroflexion, 234
in retroversion, 223
with sound, 87, 88
Bladder:
affections of, 770-777
calculus in, 782
changes in position of, 15, 17, 37
cystitis of, 778-781
examination of, 770
hyperæmia of trigone, 777
interfered with by displacements, 17-19, 169
by fibroids, 404
by cancer, 528
Bladder (*continued*)
irritability of, 37, 777
physiological rest to, 768
prolapse of, 709
tumours and growths of, 785
Blennorrhagia. See Gonorrhœa
Bright's disease, 101
Broad ligaments, 18, 19
Bromide in cancer of the neck, 540

Calculi, 782, 815
presence of vesical, 784
removal of, 783, 784
Canal of Nuck, 4
Cancer:
deciduoma malignum, 504-511
discharge in, 528
etiology of, 512
of body of uterus, 512-560
of cervix, 512, 518, 520-531, 542, 545, 550-560
of vagina, 711
of vulva, 756
operations for, 541-560
pain in, 526, 527
relief of, 539, 540
parasitic coccidia in, 515
treatment of, 538-541
Cardiac degeneration from abdominal tumour, 415
Caruncle, vascular, of urethra, 6, 766
Castration, 489. See Ovariotomy
Catarrh of cervix uteri, 323, 324
Catgut. See Sutures, 425-434
Catheter:
method of passing, 4, 35
self-retaining, 265
Catheterization of ureter, 788
Cauliflower excrescence of uterus, 519
Caustics producing atresia, 132
Cauterization, galvano-chemical, 325
Cautery, galvanic, 113
Paquelin's, 113
Cellulitis, pelvic, 349, 351
Cervical glands, adenoma of, 512
Cervical mucus, character of, 22, 23
Cervix:
amputation of, 280-283
cancer of, 512, 520-531, 542, 545, 550-560
chronic inflammation of, 315
congenital stenosis of, 21
conical, 21
conoidal, 22
cystic, 340
degeneration of, 339
depletion of, 112
division of, 20, 116

Cervix (*continued*)
ectropion of, 288
elongation of, 274
causation and treatment, 275
erosion of, 337-345
flexions of, 212
follicular degeneration of, 338, 345-347
granular degeneration of, 339
causation, 341
pathology, 339
symptoms, 341
treatment, 341-343
hypertrophy and hyperplasia, 274
hypertrophy of, in prolapse, 251
incision of, 20, 115, 214
in pregnancy, 21
laceration of, 332-338
secretions from, 22, 23
stenosis of, 22, 215
tuberculosis of, 499-503
Chlorosis. See Anæmia
Chromic acid, 128
Climacteric, 40, 144-146, 629
Clitoris, 4, 5
fibroma of, 686
hypertrophy of, 5
removal of, 4
Cocaine in gynæcology, 73
Coccygodynia, 757-759
causation, 757
treatment, 758, 759
Coccyx, resection of. See Coccygodynia
Colectomy, 358-360
Colpitis. See Vaginitis
Colpoperinæorraphy, 279, 280
Colporraphy, 274, 276
Condylomata, 745
Conjoined manipulation, 86-88
Constipation, aperients in, 173
dilatation for, 174
Corporeal endometrium, changes in, 549
Correlation of sexual function and insanity, 629
Countenance:
malignant uterine disease, 529
ovarian dropsy, 81
Crutch, 45, 48
Alexander's, 48
Curette, 132
Curettage, 23, 132-137
dangers of, 136
in salpingitis, 135, 137
of suppurative endometritis, 135
precautions in, 135
Cycling, dangers of, 154
Cystitis:
causation and symptoms, 778
changes in bladder in, 778, 779
course and termination, 779
treatment, 780
urine in, 779
Cystocele, 249, 250, 253, 255
Cystomata, ovarian. See Ovarian Cyst
Cystoscope, electric. See List of Appliances
Cystoscopy, 722
Cysts:
dermoid, 632, 634-636
in salpingitis, 574-576
multilocular, 121, 633
of the labia, 752
of paroöphoron, 636, 637
of parovarium, 637, 638
oöphoritic, 632, 636
tubo-ovarian, 638, 639
unilocular, 121, 635

Deciduoma malignum, 504-511
diagnosis of, 509
differentiation of, 505, 509
nature of, 505-507
symptomatology, 508
treatment, 510
Decortication of fibrous tumours, 539, 477, 478
Dental pulp, menstrual congestion of, 144
Dermoid. See Cysts
Descent of uterus, 277
Diabetes, 101, 682
Digital examination, 84-88
Dilatation of cervix, 18, 23, 74-80
by Duke's dilator, 78
by force, 79
by graduated bougies (Macnaughton-Jones'), 77
by Hégar's dilators, 77
by Lawson Tait's dilators, 79
by More Madden's dilator, 78
by Reverdin's dilator, 78
by tents, 74-80
dangers of, 137
in fibroids, 403
of uterine canal, 171
Dilatation of vagina, 689
solid glass dilator of Author, 688
Discharges, 43, 95-100, 194
air, 100
character of, 43, 95-100
classification of, 95

Discharges (*continued*)
fœtid, in cancer, 528, 535
gonorrhœal, 696, 700
hæmorrhagic, 95, 97, 99
mucous, 95, 96
purulent, 97
sebaceous, 96
source, 95-100
watery, 95
Displacements, 197. See Uterus
Dorsal decubitus position, 44
Dorsal position, patient in, 46
Dorso-sacral position, 45
Douche, uterine and vaginal, 185, 187
Douglas' pouch:
drainage by. See Morcellement
examination of, 13, 14
fluids in, 14
situation, 13
tumours in, 13
Drainage supports, 724
Dropsy:
of Fallopian tube, 568
ovarian, 81, 84
Dysmenorrhœa, 161-185
classification, 147
congestive or inflammatory, 165-168, 180
electrolysis in, 184
in polypus uteri, 383
Matthews Duncan on, 168, 169
membranous, 183-185
neuralgic, 163, 175
obstructive, 165
ovarian, 163, 181
spasmodic, 166
sulphonal in, 175, 185
treatment in, 171, 172, 180-184
varieties of, 147, 161-185
Dyspareunia, 320, 573
Dyspepsia, atonic, 192

Electricity in amenorrhœa, 160
Electrolysis in dysmenorrhœa, 182-184
Electro-therapeutics, 846-865
appliances for faradic treatment, 851-853
appliances for galvanic treatment, and for galvanic cautery, 853
details of method, 849
criterion to fix limit of dose, 861
operation itself, 860, 861
precautions after operation, 862, 863
details of galvano-caustic method, 859
Electro-therapeutics (*continued*)
details of galvano-puncture method, 862
indications for, 856-858
preliminary measures and precautions, 859-862
asepsis, 851
Elephantiasis of vulva, 754
Elytrorraphy, 276
Endometritis, 110, 315
acute, 310
causation, 319, 323
cauterization for, 325
chronic cervical, 316, 317
corporeal, 319, 323-325
fungous, 532
gonorrhœal, 567
hypertrophic, 318
pathology, 315
prognosis, 320
treatment, 320, 322
Endo-salpingitis, 572
Enemata, 31, 173, 174, 458, 463
Enucleation in uterine fibromata, 472-474
Episiorraphy, 268, 283
Erosion of cervix, 22, 337-345
Erysipelas, 726
Esthiomene of the vulva, 743
Examination of a case, 37-109, 645
appliances necessary, 38
conjoined, 86
digital, 84, 90
mode of, 81
position for, 50
rectal, 106
Exploratory incision, 106
Extirpation of annexa. See Oöphorectomy
Extirpation of uterus, 560

Facies ovariana, 81, 648
cancerous, 529
Fæcal tumours, 407
Fallopian tubes, 23, 561-586
adhesions of, 23, 565, 567, 568
apoplexy of, 577
calibre of, 24
carcinoma of, 561
catheterization of, 24
cysts of, 567, 574-576
dilatation of, 24
dropsy of, 568
hernia of, 585
hæmato-salpinx, 577
hydro-salpinx, 577
inflammation of, 573
papilloma of, 561, 581

LEEDS & WEST RIDING MED.-CHIRURGICAL SOCIETY

Fallopian tubes (*continued*)
patency of, 24
patulous condition of, 24
pyo-salpinx, 580
salpingitis, 563-573
situation of, 23
stricture of, 567
structure of, 563
tubercle of, 94, 582, 583
tumours of, 578
twisted, 519
Fat thrill, 83
Feeding after hysterectomy, 458, 462
after ovariotomy, 678
Fibrocystic tumour of uterus, 392, 405, 406
treatment of, 410
Fibroid tumours of uterus, 390-415, 489
complicated with pregnancy, 395, 396, 406, 407
degeneration of, 394
diagnosis, 399-401
differential signs of, 401-403
differentiation of, from partial inversion, 289
dilatation in, 403
drainage in, 438, 442
electrolysis in, 414
enucleation, 405, 472-474
etiology, 390
hæmorrhage in, 411
history of, 401
interstitial, 397, 408, 474
intra-ligamentary, 396
ligation of arteries in, 412
mortality in, 491-497
pathology, 390-393
results, 404
surgical treatment of, 435
appliances required for, 420, 421
arrangements for, 421-425
by Baer's method, 440
by Bardenheuer, 436
by decortication, 439, 478
by Doyen's method, 437, 448
by enucleation, 438, 473
by Hégar's method, 435, 441
by hysterectomy, 441-488
by Jessett's method, 437, 485
by Martin, 436, 467
by mixed method, 438, 478
by morcellement, 438
by myomectomy, 438
by oöphorectomy, 439
by salpingo-oöphorectomy, 439, 489
Fibroid tumours, surgical treatment of (*continued*) [465
by Schroeder's method, 436,
by Zweifel's method, 439
submucous, 397
subperitoneal, 397, 398
symptoms, 401, 404
transition of, 394
varieties of, 396
Fibromata, 394. See Fibroids
Fibromitis, 394
Fibromyomata, 395
Fistula, recto-vaginal, 684, 722, 823
ureteral, 444
urinary, 715
vaginal, 684, 715, 723
vesico-vaginal operation for, 718-721
Fixation of pedicle. See Hysterectomy and Ovariotomy
Fixation of uterus :
direct lateral, 243
direct mesial, 244
indirect, 242
Fœtal heart-sound, 84, 151
Fœtation, tubal. See Tubal Fœtation
Follicular degeneration of cervix uteri, 339
Follicular vulvitis, 747
Fundus uteri. See Uterus

Galvanic pessaries, 159
Galvano-caustic, Apostoli's treatment. See Electro-Therapeutics
Genu-pectoral position, 12
Glycosuria in ovariotomy, 682
Gonorrhœa (vaginitis), 694-699
complications and results, 695
latent, 695
micro-organisms in, 308, 567
treatment of, 699, 700
Gouty diathesis and dysmenorrhœa, 169

Habits, influence of, 41
Hæmatemesis, vicarious, 39
Hæmatocele, 122, 372-381
causes, 123, 374
diagnosis, 377
extra-peritoneal, 380
intra-peritoneal, 122, 373
pelvic, 122, 372
peritoneal, 372
prognosis, 378
puncturing, 122
retro, 372
symptoms, 374
treatment, 378

Hæmatoma. See Vulva
Hæmato-salpinx, 577
Hæmoptysis, vicarious. See Vicarious Hæmorrhage
Hæmorrhage, 3, 39, 116, 186-196, 371, 411, 445, 459, 490, 491, 526, 527, 529, 530, 553, 578, 596, 655, 705, 707
hæmato-cystic, 578
internal, 655
pelvic, 371, 372. See Hæmatocele
secondary, 553
treatment of, 39, 116, 186-196, 411, 445, 459, 476
local, 186
general, 186
vicarious, 39, 148, 150
Hæmorrhoids, 30, 825
in pregnancy, 825
Hæmostatics, 190, 191
Health resorts and spas, 156, 880
in affections of the urinary organs, 882, 883
in affections of the nervous system, 883
in anæmic states, 156, 881
in defective biliary metabolism, 882
in gout, 882
in pelvic affections, 880
in skin affections, 883
in strumous affections, 881
Heart, in anæsthesia, 71
Hermaphroditism, 728-732
Hernia into labium, 3
of Fallopian tube, 585
of ovary, 585
post-operative, 497, 498
Hot douche, danger of, 188
Hydramnios, Hydrastis, and Hydrastia, 648. See Diagnosis of Ovarian Cysts
Hydrastis, 190
Hydroceles of round ligament, 4
ovarian, 638
Hydropathic establishments for sea bathing. See Health Resorts
Hydro-salpinx, 577
Hydro-therapeutics. See Health Resorts
Hymen, abnormalities of, 9-11, 703, 704. See also Vulva
atresia of, 704
bearing on chastity, 10-12
folding, 10, 11, 703. See Vulva
imperforate, consequences of, 11, 12
Hymen, incision of, 708
Hyperæmia, 307, 309, 310
passive, 310
symptoms, 309
treatment, 310
Hypertrophy of cervix, 251, 274
Hysterectomy, abdominal, 441
after-treatment of, 458
Doyen's method, 479-484
extra-peritoneal, 435, 441-463 471
indications for, 487
intra-peritoneal, 436, 464
Jessett's method, 484-487
pan, 436, 466, 471, 484, 487
rules for, 559
sacral method of, 560
supra-vaginal without ligature of cervix, 440
total abdominal, 479-484
total vaginal, 484
vaginal, 463, 549
Hysteria, 163, 175, 194
Hystero-epilepsy, Charcot on, 164
Hysterorraphy, 240
Hysterotomy, 389

Incision, crucial, in hymen, 708
of cervix uteri, 115, 214
Incontinence of urine, 16, 785
Alexander's operation for, 785
forcible dilatation for, 785
Indications for salpingo-oöphorectomy, 610
Inflammation, 307
Injections:
dangers of, 128, 129
different methods of employing, 128, 129
intra-uterine, 128
Injectors, different kinds of, 130
Insanity, 609
Intestines in operation, 449, 450, 492, 493. See Hysterectomy
Intra-uterine injection, 128, 129
medication, 125-128
stems, 117, 217
suppositories, 131
Inversion of uterus, 285-296
causes, 286, 405
classification of, 288
differential diagnosis, 288
methods of reduction:
Aveling's, 293
Barnes', 293
Braxton Hicks', 292
Emmett's, 291
Noeggerath's, 292

Inversion of uterus (*continued*)
prognosis, 289
signs and symptoms, 288
stages, 285
treatment, 289
by amputation, 295
by taxis, 290
palliative, 290
pressure, 290, 292
Iron, 157

Jacket, Dowd's, 263

Kangaroo, tendons of the. See Ligatures
Kidneys, abscess of, 807
adenoma of, 808
affected by cancer, 528
aspiration of, 805
calculus of, 815
causes of enlargement of, 806-808
diseases of, 802-816
examination of, 804
hydro-nephrosis, 806, 809, 810
landmarks of, 803
movable or displaced, 810-814
sarcoma of, 808
tumours of, 810
varieties of affections, 806-808
Kobelt, bulb of, 3

Labia, affections of, 3. See Vulva, Folliculitis
Labium, hernia of, 3
Laceration of cervix uteri, 332
consequences of, 335
diagnosis, 335
of perinæum, 263
operation for, 264
symptoms, 335
treatment of, 336
Lactation, prolonged, 646, 653
Laparotomy, 679
Leg-rests, 262, 263
Leptothryx buccalis, 96
Leucorrhœa, 186, 196
a symptom, 194. See Discharges
examination for, 195, 196
nature of, 195
treatment of, 196
vaginal, 195
varieties, 195
Ligaments:
broad, 18, 19
fibromata of, 477
round, 18, 19
Ligatures, chain, 432, 433
Ligatures, varieties of, 432, 433
Litholapaxy, 783
Lithotomy, vagino-vesical, 784
Lymphatics, relation to septicæmia, 22

Malformations of the cervix, 170
clitoris, 4
Fallopian tubes, 561, 702
hymen, 10, 11, 703
ovaries, 598
urethra, 761
uterus, 164, 170
vagina, 700, 702
Mania, climacteric, 40, 629
Massage, 161, 182, 866-880
abdominal, 866
dangers of, 875
diseases useful in, 873-875
in uterine displacement, 866
muscles, 869
nerves, 869
physiological effects of, 868-873
on lymphatics, 870
rules for application of, 878, 879
urine after, 872
varieties of, 867, 868
vascular mechanism, 869
Masturbation, 4, 685
Measurement of abdomen, 51, 82
Meatus, affections of. See Urethra
position, 5, 6
urinary, 5
Medication, intra-uterine, 22, 126-128
Medicator, intra-uterine, 130
Medico-legal relations to menstruation, 627-629
Menopause, 39
affections of, 40, 41
Menorrhagia and metrorrhagia, 43, 147, 186-196
in polypus uteri, 383
some practical rules, 186
treatment, 187
Menses, retained, 707
Menstruation and ovulation, 28, 29, 42, 139, 140
arrested, 104
disorders of, 30, 39, 139-196
effects of sea air on, 42
irregular, 42
medico-legal relations to, 627-629
mental disturbance in, 625-629
physiology of, 28, 29, 139-143
pigmentation in, 143
retained menses, 707
vicarious, 39
views regarding, 28, 139-143

Metallo-therapy, 164
Metritis :
acute, 310
causation, 311
diagnosis, 311
prognosis, 312
symptoms and signs, 311
treatment, 312-315, 325
chronic, 315
septic, 311
Micro-organisms, 308, 351, 566, 567
Microscope, 100
in diagnosis, 100, 326
of carcinoma, 515, 517, 531, 534, 548
of fibroid tumours, 391
of gonorrhœa, 308
of ovarian cysts, 652, 653
in discharges from uterus, etc., 100
in fungous endometritis, 532
Micturition, 199
Minor gynæcological operations, 110
Mobility of uterus, importance of, 16
Moles, tubal, 587, 588
Morcellement of uterine fibromata, 438, 472, 474-476
Morphia, craving for, 175-178
employment of, 459
Morphiomania, 177
Mortality of various operations, 491-497
Mucous discharges. See Discharges
Myoma of uterus, 391, 393, 369, 400
Myomata, Veit's method for, 478
Myomectomy, 438, 476
Myxomata, 532

Necrosis. See Uterine Fibroma and Cancer of Uterus
Needle-holders. See Appliances
Needles. See List of Appliances
Neoplasms, uterine, 381
Nervous system, 141
Neurosis, uterine, 297-306
Nuck, canal of, 4

Obesity, 871
Occupations and habits, influences of, 41
Oöphorectomy, 489, 490, 626-628
indications for, 489, 490
Oöphoritis. See Ovaritis
Operations :
Alexander's, 236
celio-vaginal, 558
choice of, 546-549
Doyen's, 553-556
Operations (*continued*)
for closure of vagina, 710
for creating new uterine axis (Sims), 213, 214
for laceration of cervix, 336
for vaginal fistula, 715
hysterorraphy, of, 240
in cancer of the uterus, 542
in electro-therapeutics, 846-865
in prolapse of the uterus, 261
in uterine fibromata, 425-496
Jessett's, 556, 557
Martin's, 552
minor gynæcological, 110-138
mortality and risks of, 491, 493
myomectomy, 476
oöphorectomy, 489
on the Fallopian tubes, 618-624
on the perinæum, 263-267
on the rectum, 823, 825, 827
on the urethra, 760
on the ureters, 798-800
on the vagina, 268
on the vulva, 736
ovariotomy, 668-674
Récamier's, 550
salpingo-oöphorectomy, 489, 610-620
Schroeder's, 545, 549, 550
Terrier's, 243
Ophthalmoscope in diagnosis, 43, 100
Optic neuritis, 103
Ostiaks, ligatures of, 433
Os uteri :
division of, 116
normal, 20
of pregnancy, 21
pinhole, 21
stenosis of, 21
Os uteri externum, 20-22
Os uteri internum. See Isthmus
Ott, crutch of, 45
Ovarian diseases, classification of, 630-642
Ovarian cysts and cystomata, 613, 630-660
adenomata, 633
adhesions of, 643, 654, 674
ascites with, 648, 649
classification, 630-642
contents of, 651
diagnosis, 643-656
differentiation, 644, 645, 648, 655, 809
examination for, 645
exploratory incision in, 106, 653
fluid, character of, 651, 652
hæmorrhage into, 655

Ovarian cysts (*continued*)
history of, 646, 649
hydroceles, 638
inflammation of, 655
malignancy, 653, 656
microscopic appearances, 652, 653
oöphoritic, 632
multilocular, 121, 633, 656
unilocular, 121, 635, 656
paroöphoritic, 636, 637
parovarian, 637, 638, 656
pathology of, 630-642
pedicle, twisting of, 641
physical signs of, 646, 651-653
negative, 652
positive, 651
rotation of, 641
rupture of, 639-641
secondary changes of, 639
shape of, 648
symptoms of, 646
tapping in (through abdomen), 648, 649, 658
treatment of, 657-660
Ovaries:
absence of, 597
adhesions of, 25, 623, 654, 674
apoplexy of, 27, 28, 604, 605
arterial supply, 27, 28
atrophy of, 28
carcinoma of, 631
corpora lutea in normal, 27
cysts of. See Ovarian Cystoma
dermoid cysts of, 632, 634-636
displacements of, 597
dropsy of, 84
endothelioma of, 664, 665
enlargement of, 27
examination of, 607, 645
fibroma of, 660-664
follicles of, 27, 606
functions of, 28
gyroma of, 665
hernia of, 597, 598
influence of the circulation on, 27
irritable, 608
lymphatics of, 27
myoma of, 630, 660
neuralgia of, 608
palpation of, 607
papilloma of, 666, 667
position of, 27
prolapsus of, 598
resection of, 623
sarcoma or fibroma of, 630, 660, 667
Ovaries (*continued*)
size of, 27
tubercle of, 584
Ovariotomy, 657, 668-683
appliances required for, 616-624, 668, 669
during pregnancy, 680
extra-peritoneal method, 680-683
in children, 94
intra-peritoneal method, 668
treatment after operation, 677, 678
Ovaritis, 599-609
causation, 599, 607
cortical, 600-602
cystic, 603
hydro-cystic, 603
pathology of, 599
pyocystic, 606-608
treatment of, 598, 608
Ovulation, 139. See Menstruation

Pain, importance of, 143-146, 161-165, 404
hysterical, 144, 164
in back, 143, 309
in cancer, 526, 527
in groins, 143
in hypogastric region, 143
reflex, 170
relief of, 132, 174, 175, 178, 179, 181, 415, 459, 539, 540, 609
remarks on, 143
Palpation, 82, 83
abdominal, 82
of kidney, 803
Papilloma of the ovary, 666, 667
of the Fallopian tubes, 581
of the vulva, 743
Paracentesis abdominis, 118
in ovarian tumours, 118
in pelvic hæmatocele, 122
in pregnancy, 118
vaginal, 121
Parametritis, 365-371
causation, 365
differentiation, 348-350, 371
diagnosis, 366
pathology, 365
symptoms and physical signs, 367
treatment, 369-371
Paroöphoron, 632, 636
Parovarium, 632, 637
Pedicle, management of, 449-458
in hysterectomy, 487, 488
in ovariotomy, 673
Taylor's method of clamping, 453
Pediculi, 735

Pelvic fascia, 18, 19
Pelvic organs in children, 91-94
Pelvic suppurations, 348-365
operative treatment for, 361-365
Percussion, 83
Perimetritis, 20, 348-365, 568, 572
causation, 20, 351
differentiation, 349, 371
pathology, 351
prognosis, 360
serosa, 350
symptoms and physical signs, 355
treatment, 360
Perinæal body, 261
absence of, 264
needles, 268
restoration of (perineorrhaphy), 261
Perinæum, 12
dangers arising from, 12, 263
immediate treatment of, 263
influence on displacements of, 12
laceration of, 12, 263
operation for, 264-274
relaxation of, 12
use of, 262
Perineorraphy, 261
Perineotomy, 620, 621
ovaro-salpingitis, 504
Peritoneal toilet, 674-676
Peritoneum, 106, 679
Peritonitis, pelvic. See Perimetritis
Pessaries, 91, 257-260. See List of Applianees
remarks on, 201
rules for use of, 204, 228
Phlegmon :
pelvic, 198
peri-uterine, 348, 365. See Parametritis
Physometra, 100
Piles. See Rectum
Placenta, 512
Plethora, 152
Polypus uteri, 381
cellular, 382
complicating prolapse, 254
diagnosis, 383, 384
differentiation from inverted uterus, 383
fibroid, 381-383
glandular or mucous, 382
placental, 382
signs and symptoms of, 383-386
negative, 385
positive, 384
submucous, 381, 382
treatment of, 383, 386-389
Polypus uteri, treatment of (*continued*)
Atthill's method, 387, 388
Position, genu-pectoral, 12, 48
Position of patient for introdueing Sims' speculum, 44
Pouch of Douglas. See Douglas' Poueh
Pregnaneies and abortions, 41
Pregnancy :
after oöphoreetomy, 613
cause of hæmatocele, 374
complicating fibroma, 407
complicating ovarian tumour. See Ovarian Cysts
differential diagnosis of, 149
Hégar's sign in, 149, 150
in vaginismus, 691
retinal complications in, 101, 102
with cancer of uterus, 526
signs of, 149-151
tubal, 586-596
Probe, uterine, of Sims, 58
Procidentia uteri, 9
Proctitis, 820
Prolapse of uterus, 249, 273
causation, 251, 252
diagnosis, 254
rectum, 709
bladder, 709
stages of, 249
symptoms, 253
treatment, 255
by replacing, 257
methods of retaining replaced uterus, 257
by pessaries, 257
by surgical means, 261, 262, 289
perineorraphy, 261
of vagina, 276, 708, 709
Prolapsus of ovary, 598
Pruritus, 735-742
Pseudo-hæmato-salpinx. See Salpingitis
Puberty, period of, 142
Pudendal hæmatoma, 752
Pudendal hæmorrhage, 3, 752
Pulsatilla, 161
Punction, vaginal, 121
Pyo-nephritis, 528
Pyo-salpinx, 580

Reetal examination, 14, 31, 90, 91, 100
Rectal exploration :
in children, 91
Simon's method, 90
Rectoeele, 30, 249, 262, 280, 281

Rectum, 30, 817-839
abscess, 823
affections of, 817
classification, 817
examination of, 14, 30, 90, 91, 106, 817
fistula, 30, 822-825
operations for, 823, 824
hæmorrhoids, 30, 825-831
in pregnancy, 825
mortality after, 826
relation to uterine disease, 30, 539, 825-827
various operations for, 827-831
hæmorrhage, 831
plugging for, 831
impacted fæces, 539, 821
in cancer of uterus, 529, 539
malignant disease, 833
neglect of, 30
polypus, 835
procidentia, 835
proctitis, 820
pruritus ani, 30, 834
rectocele, 249
sympathy with uterus, 30
therapeutics, general, 835
tumours of, 821
ulceration and stricture, 832
Verneuil's operation for, 833
Reflexes, various forms of, 101, 177, 297-306
aural, 298, 299
cardiac, 298
cerebral, 298
cutaneous, 298
dental, 298
disorders of uterus causing, 298, 299
disorders of locomotion, 305
gastric, 298, 300
hepatic, 298
intestinal, 298, 300
laryngeal, 305
lumbar, 298
mammary gland, 297
Ménière's disease, result of, 299
nasal, 29, 299
neuralgia of the eyeball, 298
ocular, 298
origin of, 297
rectal, 101-106
retinal, 297
sacral, 298
sources of, anæmic and toxæmic, 298
spinal, 298
Renal enlargements, 806-808
Repositor. See List of Appliances
Retention of urine:
mode of passing catheter in, 4
with displacements of uterus, 17
Retinal complications in pregnancy, etc., 101, 102, 105
Retractors. See List of Appliances
Retroflexion of uterus, 37, 233-236
causation, 233
diagnosis, 233
treatment, 234
Retroversion, 221-233
causation, 221
diagnosis, 223
symptoms, 222
treatment, 223, 227
Rotation of sound, 225, 227

Sac, fœtal. See Tubal Gestation
Salpingitis, 27, 561-573
bacteriology of, 566
catarrhal, 566, 577, 580
chronic atrophic, 573
classification of, 565
diagnosis of, 563
etiology of, 566
exploratory incision for, 564
gonorrhœal, 567
parenchymatous, 572
pathology of, 572
removal of uterine appendages for, 571
tubercular, 582, 583
Salpingocele, 585
Salpingo-oöphorectomy, 489, 610-620
alternatives of, 621, 624
indications for, 610-618
Salpingo-ovaritis, 482
Salpingostomy, 570, 585
Salpingostraphy, 623
Santonine, 161
Sarcoma uteri, 532-537
symptomatology, 535
Scirrhus of uterus, 514, 516
Sclerosis of the ovary, 603
Scyballa:
removal of, 821
differentiation of from tumours, 821
Sea-air, 42
Sea-bathing, effects of, 42
Semi-prone posture, 44
Septicæmia, 3, 22
after tents, 76
Serous peritonitis. See Perimetritis
Sexual function and insanity, 609, 625-629
Sims, semi-prone position of, 44

Slice, speculum, Macnaughton-Jones's, 109
Solutions for intra-uterine medication, 128
Sound, uterine, 58. See Appliances
as a means of diagnosis, 59-66, 88
dangers attending use of, 64, 160
in displacements, 61, 65, 225
in subinvolution, 330
method of introduction, 61, 64, 65, 89, 225
Olivier's irrigating, 59
various kinds of, 58, 225
Spas, 172, 880-883. See Health Resorts
Speculum in diagnosis, 52
Speculum forceps, 58
slice, Author's, 109
Sphincter ani, laceration of. See Perinæum
Sphincter ani, dilatation of, 174
Sponge-holder, 57
Sponges, compressed, 419
Spray, chlorethyl, 120
Stem pessaries, 218. See Appliances
dangers of, 218
Sterility, 24, 29, 840-845
causes of, 169, 176, 404, 841-844
treatment of, 844, 845
Stethoscope, 51
Stone in the bladder, 782, 815
causation of, 5
Strangulation of intestines, 460, 461
Stypticine, 191
Subinvolution of uterus, 327-331
Sulphate of magnesia, after hysterectomy, 459
Support, leg, Howard Kelly's, 252
Suppositories, 344
intra-uterine, 131
Suppurations, ovarian, 641, 655
pelvic, 348-371
Suspension of uterus, 241, 242
Sutures, 425-434
à étages, 429
à points séparés, 428
catgut, 427
continuous, 428
Czerny's, 427
Gussenbauer's, 427
in hysterectomy, 430, 431
Lembert's, 427
mixed, 429
overlying, 429
silk woven, 426
varieties of, 241, 243, 244
Syphilis, 325
as a cause of sterility, 841
Syphilis (*continued*)
evidences of constitutional, 745
Syphon rectal feeding-tube, 124

Tables, operation. See List of Appliances
Czempin's, 45
Tampon: after hysterectomy, 445
Mickulicz's method of using, 445
of the cervix, 112
of glycerine, 325
of iodoform gauze, 445
of the uterus, 228
of the vagina, 193, 344, 539
Taxis in reduction of inverted uterus 290
Temperament, the neurotic, 301-303
Temperature, 68
Tents, 73-79
dangers attending use of, 73
disinfection of, 76
laminaria, 74, 171
method of introduction, 76
rules to observe when employing, 74
sponge, 74
tupelo, 74, 171
Test-papers of Oliver, 67
Thermometer, clinical, 38
Tinnitus aurium, 43
Toilet, peritoneal, 674-676
Trachelorraphy, 336
Trigone, hyperæmia of, 777
Tubal abortion, 589, 593
Tubal mole, 587, 589
Tubal pregnancy, 586-596
changes consequent upon, 587
in the ovum, 587, 589
in the tube, 587
gestation, broad ligament, 595, 596
tubo-uterine, 592
placenta, 590
rupture of the tube, 589
primary extra-peritoneal, 589, 590
primary intra-peritoneal, 589, 590
secondary rupture, 591
symptoms, 592
treatment, 594
Tuberculosis of cervix, 500
of Fallopian tube and ovary, 582, 583
of uterus, 499-503
infection of, 503
microscopic examination in, 499

Tuberculosis of uterus (*continued*)
polypoid, 532
symptomatology, 499
of vagina, 711
Tumours:
of the abdominal annexes. See Fallopian tube and ovary
of the kidney, 810
of the ovary, 645
of the urethra, 767, 768
of the uterus. See Fibroids
of the vulva, 754

Ulcer, esthiomenic menstrual, 39
Umbilicus, 82
Ureter:
anatomy of, 32-34
avoidance of, in operations, 552. See Hysterectomy
calculus in, 794
catheterization of, 35, 788
examination of, 31, 32
fistula of, 795
landmarks of, 35
palpation of, 34, 35
sounding of, 794
stricture of, 794
surgery of, 798-800
wounds of, 442-444
Ureteritis, 787
Urethra, 4, 5, 106, 761
abnormalities of, 761
abscess of, 763
affections of, 761-769
angioma of, 766
caruncle of, 766
dilatability of, 5, 106, 765, 770
excrescence of, 766
exploration of, 106
fistula of, 723, 766
calibrator for, 5, 774
inflammation of, 761
in litholapaxy, 6
malignant diseases of, 767
meatus of, 5
lupus of, 765
polypus of, 766
prolapse of, 762
relation to vagina, 4
stricture of, 765
Urethritis, 6, 761
Urethrocele, 762, 763
Urinary fistula, 723, 795
Urinary organs, 31
affections of, 770 777
complicating pelvic disorders, 31
relations of, 31
Urine, examination of, 66, 67, 690
Urine in vaginal irritation, 690, 691
Uterine arteries, 24, 32
canal, opening of, 708
cavity, dimensions of, 14
Utero-abdominal exploration. See Examination of a Case
Utero-sacral ligaments, 10, 18
Uterus:
amputation of the neck of, 280
anteflexion of, 208-214
causation, 209
diagnosis, 211
Gaillard Thomas on, 202, 209
symptoms, 210
treatment, 212
anteversion of, 198-208
degrees of, 199
diagnosis, 199
treatment, 200
ascent of, 275
atresia of, 700, 701
axis of, 15
cancer of body, 500
age, 513
cachexia in, 529
diagnosis, 530, 533
etiology, 512
extirpation of, 560
gyroma of, 616
microscope in, 520, 531
origin of, 514, 517
pathology, 533
prognosis, 537
symptoms and physical signs, 526-531
treatment, 538-541
operations for, 542
method of Doyen, 553-556
of Freund, 560
of Jessett, 556-558
of Martin, 552
of Récamier, 550
of Schroeder, 545, 549-551
of Sims, 544
varieties:
adenoma, 531, 532
cancroid, 520, 524
carcinoma, 520-524, 530, 531, 534
cellular, 516
deciduoma malignum, 504
epithelioma, 520, 525
medullary, 516, 519
sarcoma, 530-532, 534-538
scirrhus, 514, 516
cancer of cervix, 517, 519

Uterus, cancer of cervix of (*continued*)
carcinoma of, 520
causation, 524
epithelioma of, 520
prognosis, 537
signs and symptoms of, 526, 527, 531
treatment of, 538-36c
by Schroeder's operation, 545, 549, 550
by vaginal hysterectomy, 549, 550
cauliflower excrescence of, 519
cervix uteri, 20-22, 116
incision of, 214
changes in, due to menstruation, 125-129
congestion of, 17, 126
conical cervix, 21
collateral treatment of, 623
contractions of, 29, 30
curettage of, 23
dilatation of, 76
displacements of, 16-18, 196
their predisposing causes, 197
their results, direct and indirect, 198
division of, 216
enlargement of, 327
examination of, after pregnancy, 526
extirpation of, 283, 493
fibroid tumours, or fibromata of. See Fibromata
fixation of, 15, 236, 242-246
hyperæmia of, 307. See Hyperæmia
hypertrophy and hyperplasia of, in children, 94
inflammation of, acute, chronic, 307-325
infra-vaginal portion of, 19
inversion of, 285-296
isthmus of, 14, 16
ligaments of, 18, 19
malformations of, 167, 170, 701
measurements of, 14
microscopical diagnoses of growths of, 326, 548
mobility of, 16
natural position of, 15
necrosis of, 545
polypus of, 381-389
procidentia of. See Prolapsus
prolapsus of, causation, 252
complicated with cystocele, 255
complicated with polypus, 254
Uterus, prolapsus of (*continued*)
diagnosis, 254
pathology of, 251
symptoms, 253
treatment, 255
relations of, 14, 15
retroflexion of, 233-236
diagnosis, 233
treatment, 234
retroversion of, 37, 221-233
causation, 221
diagnosis, 223
degrees of, 222
symptoms, 222
treatment, 223, 227
sarcoma of, 532-537
stenosis, 17, 213
subinvolution of, 327
causation, 328
diagnosis, 329
pathology, 327
symptoms, 330
treatment, 330
suspension of, 241, 242
tuberculosis of, 326, 499-503

Vagina, 6, 684-726
absence of, 702, 705
affections of, 684-726
associated movements of, 8, 9
atresia of, 700, 705
bacteriology of, 726
cancer of, 711
cicatrices of, 725
closure of, 708, 710
cystic tumours of, 121, 641, 642, 710
decubitus on, 12
dilatation of, 6
discharges from, 43, 95, 96, 98
disinfection of, 121, 124
distension of, from imperforate hymen, 9, 706
enterocele of, 725
epithelioma of, 711
examination, 18
fistulæ of, 715-725
fixation of, 283
influence of respiration on, 6
malformations of, 702
muscularity of, 6
operations on, 268, 276
prolapse of, 374-376, 708, 709
plugging of, 189
puncture by, 121
orifice, 2
secretion, 22, 95, 96, 98
tuberculosis of, 711

Vagina (*continued*)
tumours in, 710
varicocele of, 725
Vaginal walls, 6-8
fixation, 246, 247
inversion in prolapsus. See Prolapsus
relations to pelvic viscera, 6-8
Vaginismus, 684
causation, 685, 686
diagnosis, 687
operative measures, 689
symptoms and physical signs, 686
treatment, 687-689
Vaginitis, 6, 692-700
causation, 692
cystic, 693
gonorrhœal, 694-699
granular, 693
pathology of, 692, 693
signs and symptoms of, 694
treatment, 697, 699, 700
varieties, 692
Vagino-fixation, 246-248
dangers of, 248
Vicarious hæmorrhage, 39, 144
Vomiting:
after hysterectomy, 460
in appendicitis, 356
in hæmatocele, 374
in ovarian cystoma, 647
in perimetritis, 355
Vulva, 1
abscesses of, 3, 749, 750
affections of, 727-756
anatomy, 12
atresia of, 727
cancer of, 756
cutaneous affections of, 732
cysts of, 3, 754
eczema of, 733
elephantiasis, 754
epithelioma of, 756
Vulva (*continued*)
follicular inflammation of, 3, 747
gangrene of, 2, 750
hæmatoma of, 3, 752
hernia of, 3
hæmorrhages of, 3, 752, 753
hermaphroditism of, 728-732
herpes of, 734, 751
hydrocele of, 755
hyperæsthesia, 733
inflammation of, 3, 735, 747
follicular, 747
phlegmonous, 749
purulent, 3, 735
kraurosis, 739
lupus of, 743
oozing papillomatous tumour of, 743
operation on, 736
orifice of, 1
pediculi, 735
pruritus of, 735
constitutional, 737
local, 737
treatment, 737, 738
rodent ulcer of, 744
syphilis of, 745
trachoma of, 752
tumours of, 754
varix of, 752
vegetation of, 751
vulvo-vaginal gland, 750
warts of, 751
Vulvitis, 746
simple, 748
purulent, 746

Weir Mitchell's treatment, 181-183, 331, 876, 879
Wounds of ureter or bladder, 552

Zinc chloride treatment, 327

INDEX OF NAMES REFERRED TO IN THE TEXT.

ABEL, K., 317, 339
Abraham, 522, 525
Ackermann, 667
Alexander, 48, 227, 236, 238-240, 246, 247, 336, 785
Allan, Professor, 730
Allbutt, Clifford, 299
Allen, Hamilton, 379
Allingham, 823, 826, 831
Almen, 67
Althaus, 846
Amann, 667
Ambler, Hawkins, 57
Amussat, 710
Anderson, 26
Apfelstedt, 508
Apostoli, 325, 370, 415, 846, 848, 849, 851, 853, 855, 856, 859, 862-864
Appleback, 624
Aran, 330, 599
Aschoff, 508
Atkins, Gelston, 143
Atlee, 362, 651, 653
Atlee, J. L., 406
Atthill, Lombe, 110, 131, 347, 386, 387
Aveling, J. H., 288, 292-294, 313

Bacon, 505
Baer, 440
Bailey, G. F., 69
Balance, 513
Baldy, 313, 314, 459, 466
Ballantyne, 576
Bantock, Granville, 217, 220, 224, 431, 492, 626, 654, 695
Barbour, F., 60, 63, 65, 225, 226, 317, 521
Bardenheuer, 362, 436, 441, 466, 488, 493
Barker, Fordyce O., 333
Barlow, 623
Barnes, Fancourt, 269, 293, 384
Barnes, Robert, 39, 52, 54, 75, 106, 108, 130, 143, 210, 286, 292, 329, 376, 382, 385, 386, 398, 501, 527, 626, 627, 652
Barrow, 612, 621
Bartlett, J., 72, 73, 707
Bastable, 353
Bataille, 748
Battey, R., 28, 362, 489, 598
Baudelocque, 286
Beach, 504
Bedford Brown, 411
Bedford Fenwick. See Fenwick
Beigel, 139
Bell, 333, 541
Bengué, 120
Bennet, Henri, 327
Berner, 487
Bert, 69
Bidder, 391
Bieget, 514
Bigelow, Hor. R., 858, 862
Billroth, 419, 548, 807
Birch-Hirschfeld, 500
Black, G., 217, 220
Blackbee, 205
Blanchard, R., 158
Bland, 158, 194
Blau, 517
Bloodgood, 801
Bode, 362
Böhn, 679, 763, 764
Bokelmann, 247
Boldt, 466, 493, 548, 572
Bongeau, 411
Bonnet, 137, 138, 243, 272, 273, 282, 287, 295, 316-318, 335, 339, 457, 460, 465, 546, 547, 565, 573, 600, 601
Bouilly, 240, 361, 362
Boyer, L., 286
Bozeman, N., 107-109, 711, 715, 716, 720, 721, 724, 725

Brandt, 874
Braun, 259, 493
Braune, 8
Braxton Hicks. See Hicks, Braxton
Bright, 646
Briquet, 460
Brown, Bedford, 411
Brown, Martin, 760
Browne, 545
Bryant, 106, 760
Buckmaster, 855, 864
Buden, 109
Burgess, 103
Buxton, D., 69, 73
Byford, T. H., 283, 362
Byrne, J., 409, 542, 856, 857

Carpenter, George, 91-94, 500
Carrard, 736
Carter, Roe, 144
Cazin, Maurice, 504 506
Chaffey, 94
Chambers, 185, 217
Chaput, 556
Charcot, 164
Cheatle, Arthur, 94
Chéron, 725, 764, 765
Cheyne, Watson, 449
Chiari, 504
Chiene, 94
Chrobak, R., 736, 857
Clark, Miss, 142
Clark, Sir A., 524, 607
Clay, 538, 540
Cleps, 731
Clover, 45, 68, 70, 336
Coblenz, 637
Coe, Henry, 239, 514
Cole, Carter, 69
Collier, 32
Collins, 650
Condamin, 498
Cornil, 317, 319, 339, 500, 501, 512, 517
Croft, 266
Croom, 682, 784
Crosse, 285, 286
Cruveilhier, 21
Cullen, 666, 667
Cullin, T. S., 763
Cullingworth, 349, 548, 582, 583, 663, 664, 695, 706, 715, 722
Cunningham, 803
Curling, 842
Cusco, 689
Cushing, 317, 493, 548
Cutter, Eph., 414, 846
Czenipin, 45, 247
Czerny, 244, 245, 362, 427, 428

Danyan, 407
Davis (Atlanta), 756
Davis, Hall, 52
Davy, 106
De Bary, 764
Delagénière, H., 47, 362
Dentu, 622
Deschamp, 434, 483
De Wecker, 101, 102
Dieffenbach, 277
Dittel, 823
Dmitri de Ott, 547
Dodelin, 334
Döderlein, 317
Doherty, 355
Dohrn, 763
Doléris, 49, 137, 138, 272, 278, 313, 400, 457, 497
Doran, Alb., 391-393, 430, 431, 568, 570, 581, 582, 584, 585, 604-606, 660, 663, 664
Douglas Graham (Boston), 715
Dowd, 263
Doyen, 362, 401, 435, 437, 479-482, 553-555
Drysdale, 649, 652
Dsirne, 680
Dubois, Paul, 407
Dudley (Chicago), 216
Dührssen, 247, 248, 273, 362
Duke, A., 78, 118, 134, 256, 269, 344, 598
Dumaire, 515
Dumontpallier, M., 327
Duncan, M., 24, 58, 168, 170, 201, 202, 350, 351, 366, 367, 607, 684, 704, 741
Duplay, S., 764
Dupont, 47
Dupuytren, 710

Ebbing, Kraft, 627
Eckardt, C. Th., 514, 667
Edebohls, 695
Eden, 510
Edge, 137, 247, 273, 483
Edis, 699
Edwards, Swinford, 824
Eichoff, 733
Elder, 409, 410
Emanuel, 503
Emmet, Th. A., 214, 267, 277, 291, 295, 332, 333, 336, 337, 338, 349, 351, 365, 375, 397, 474, 599, 608, 689, 717, 719, 741, 762, 766, 768, 769, 771

Engelmann, G. J., 28, 29
Engliseh, 763
Ensor, 523
Erlaeh, von, 362
Erlenmeyer, 178
Esmarch, 548
Eve, 94
Ewald, 91

Fagge, 751, 753
Falk, 190
Farre, A., 17, 345
Fehleisen, 751, 753
Fehling, H., 67, 490
Fellner, 190
Fenger, Christian, 800, 802
Fenwick, Bedford, 415
Ferguson (Manitoba), 721, 723
Fergusson, 52, 55, 132
Finlay, 392
Finn, 328
Fisehel, W., 317, 318
Fitz, 357
Flaischlen, 247, 667
Floriep, 577
Forbes, Litton, 101
Foster, 867
Foulis, 656
Fournel, 137
Fournier, A., 751
Foveau, F. de Courmelles, 865
Fowler, 206, 208, 235
Frank, 490
Fränkel, A., 327
Franks, Kendal, 803
Freiburg, 79
Freund, W. A., 458, 560
Freyer, P. J., 783
Friedländer, 506
Fritsch, H., 490, 493, 518
Fry, 184

Gaiffe, 854
Gaillard Thomas. See Thomas
Galabin, 205, 467, 520, 567
Gallard, T., 29
Gartner, 631, 641, 642, 763
Gebherd, C., 512
Gehrung, 207, 208
Germont, 528
Gibson Hill, G., 408
Giles, 701
Giraud, 764, 765
Glatter, 514
Godfrey, 704
Godson, 160
Gooeh, 387
Goodell, W., 12, 13, 43, 83, 120, 188, 202, 209, 228, 230, 266, 275, 288, 333, 608, 658, 678, 722, 738, 750, 753, 757, 766, 822, 877
Gordon Black, 217
Gostling, Dr., 758
Goth, 190
Gottschalk, 191, 192, 313, 362, 504, 507
Goulard (lotion), 836
Goullioud, 547
Gow, 726
Gowland, 106, 107
Graham (Boston), 867
Graham (Toronto), 734
Graily Hewitt. See Hewitt, Graily
Greenfeld, 772
Greenhalgh, R., 117, 260
Gross, 842, 843
Grünfeld, 33
Gubaroff, 246
Guérin, Alph., 696
Gussenbauer, 427, 428
Gusserow, A., 380, 394, 492, 536, 607
Gutierrez, 463

Hagedorn, 246
Hall, 112
Hannah, 161
Hardon, Virgil O., 349, 370
Harris, 781
Hart, B., 60, 63, 65, 225, 226, 317, 521, 537
Hart, Mrs. Ernest, 182
Hartman, 351, 507
Haultain, 408
Haviland, F. W., 597
Hayes, 864
Hégar, A., 77, 79, 149, 150, 171, 280, 362, 432, 434, 435, 441, 442, 453, 457, 466, 474, 488, 492, 560, 620, 686, 765
Heitzmann, J., 7, 514, 532, 736
Heller, 67
Henle, 26
Hennig, C., 581
Herman, E., 764, 765
Hermes, 490
Herts, 391
Hewitt, Graily, 69 164, 206, 207, 217, 220
Hey, 764
Heywood Smith. See Smith
Hieks, Braxton, 130, 292, 321
Higginson, 106-108
Hildebrandt, 411
Hilliseher, 69
Hilton, 686
Hoekenegg, 362, 560

LEEDS & WI

PATHOLOGICAL SOCIETY

Hodge, 204, 220, 228-230, 235, 236, 238, 245, 258
Hofmeir, M., 490, 517
Horsford, 161
Hossmann, 247
Howard, 71
Hubert, 479
Huguier, 274, 741, 747
Hulke, 598
Hunter, 370
Hurd, 206
Hutchinson, 103
Hyrtl, 24

Jacobs, 283, 463
Jacobson, 844
Jaggard, W., 293
James, C. H., 583
Jayle, 463
Jeannel, 504
Jenner, 810
Jessett, 49, 435, 437, 466, 484-487, 493, 535, 538, 545, 548, 556-558
Johnson, 67
Johnstone, A., 28, 142
Jones, Mary A. Dixon, 493, 514, 548, 561, 563, 615, 628, 664
Jones (Edinburgh), 403
Junker, 68-71

Kaltenbach, 434, 439, 457, 492, 504, 547, 686
Keith, George, 216
Keith, Thomas, 353, 380, 445, 496, 611, 619, 626, 675, 680, 849
Kellog, 239
Kelly, Howard A., 5, 33, 45, 50, 240, 241, 262, 361-363, 445, 492, 526, 579, 584, 647, 667, 760, 771-776, 778, 782, 788, 789, 793-796, 802
Kidd, G. G., 59
Kidd, H. W., 252
Kinkead, R., 10
Kiwisch, 514
Kleberg, B. G., 453
Klebs, E., 391, 521
Kleinwächter, Ludwig, 395
Klikowitsch, 69
Klob, J. M., 286
Klotz, 242
Kobelt, 3, 576, 631
Koch, 308
Kocher, 238, 427, 483
Kochs (Bonn), 178
Kock, 763
Kœberlé, 242, 450, 452, 458, 493, 673
Kohlrausch, 15
Koppe, 755
Kortright, 755
Kreutzmann, 69
Krug, 362
Kuchenmeister, 116, 213, 214, 321
Kumerlé, 79
Kundrat, 28
Kurz, 548
Kussmaul, 460
Küstner, 497

Labadie-Lagrave, 138
Labourand, 751, 753
Lacroix, 504
Lancereaux, 528
Landau, L., 317, 339, 362
Landois, 28
Lane, 106, 107, 548, 689
Langenbeck, M., 287, 674, 761
Lankford, 626
Lannelongue, 763
Laplace, E., 308
Laroyenne, 362
Lawson Tait. See Tait, Lawson
Lebert, 520
Lee, C. C., 240
Le Bec. See Appendix
Le Fort, L., 283
Lefour, R., 79
Légars, 585
Legendre, P., 15
Lehmann, 500
Leiter, 188, 312, 313, 360, 367, 609
Lembert, 359, 427, 428, 440, 443, 567
Lemière, 142
Leopold, G., 140, 244, 283, 364, 490, 493, 547, 548, 559, 667, 696
Lewin, L., 392
Lewistein, 178
Lithgow, 523
Ludwig, 857

Macalister, 562, 602
Macan, 248, 627
Macfarlane, 426
Mackenrodt, 247, 248, 362, 847
Maclean, 722
Macnaughton-Jones, 53, 58, 59, 77, 109, 117, 130, 187, 219, 224, 225, 250, 344, 388, 389, 398, 443, 525, 578, 649, 662, 688, 816
Madden, More, 78, 269, 686, 689
Maïer, 505
Mandl, 857
Mann, 691, 778, 787
Mansell, Moulin, 183
Manson, 751, 753
Marchand, 505, 506, 667
Marcy, Henry O., 433

Markwald, Simon, 283
Martin, Auguste, 255, 264, 279, 280, 362, 392, 412, 413, 432, 436, 438, 442, 466, 474, 484, 488, 491, 492, 548, 551, 552, 566, 613, 623, 624, 847, 848
Martin, Christopher, 136, 141, 461, 465, 466, 471, 493, 707
Martin, F. H., 864, 865
Massey, 858
Maunsell, 444, 449
Mayo Robson, A. W., 353
McClintock, 191, 207, 291, 372, 410, 528
Mendelson, W., 867, 870
Mengus, 143
Ménière, 299, 394
Mikulicz, 445, 483
Mirinoff, 140
Mitchell, Weir, 179, 181, 182, 331, 876, 877
Moelaire, 755
Monprofit, 569
Montgomery, 548
Montpellier, 408
Moore, Milner, 401
Moore, W. (Dublin), 737
Morgagni, 574-576
Morris, Henry, 802, 805, 812
Morris, Malcolm, 741
Morrison, Rutherford, 509
Morton (Lecture on Cancer), 548
Müller, P., 247, 318, 504, 517, 666, 700
Mundé, P., 239, 333, 334, 492, 496, 497, 512, 514, 545, 546, 598
Murrell, 161, 868

Naboth, 315, 318, 323
Nagel, W., 607
Napier, 246, 259, 493, 628
Naunyn, 91
Neisser, 696, 738
Nélaton, 71, 372, 671
Neudörfer, 69
Neugebaur, F. L., 52, 55, 57
Newman, 33, 238
Nicolétis, 283
Nitot, 856
Nitze, 770
Noble, Charles, 134, 150, 245, 492, 494, 495, 584, 624, 811
Noeggerath, 293, 333, 334, 695, 765
Nott, 758
Nové-Josserand, 504

Olshausen, R., 138, 243, 246, 247, 436, 441, 464, 488, 490, 492, 548, 606, 736
Oliver, 66, 67
Olivier, 59
Orloff, 137
Orthmann, 247, 248
Otis, 783
Ott, D. von, 45, 262

Palfrey, 160
Pallen, 333, 781
Parsons, Inglis, 865
Parsons, F., 772, 865
Pavio, 504
Pavy, 67, 691
Pawlik, K., 33, 790
Péan, 283, 362, 453, 474-476, 483, 492
Peaslee, 159, 656
Péraire, 334
Périer, 295
Perniee, Ludwig, 512
Petersen, 443
Petit, Paul, 243, 272, 273, 281, 282, 287, 295, 313, 316-318, 335, 339, 457, 460, 465, 502, 546, 547, 565, 573, 599, 600, 605, 607
Peuch, 407, 408
Pfeiffer, 504
Pflüger, 29
Phillips, J., 380
Piehot, 517
Piedpremier, 764
Plimmer, 326, 340
Polk, W. M., 349, 362, 466, 613, 621-623
Pollard, 585
Polloek, 826, 830
Pomorski, 667
Porro, 248, 408
Poullett, 138, 370
Powell, 380
Pozzi, S., 45, 49, 109, 246, 345, 346, 391, 396, 397, 403, 425, 427-430, 432, 433, 441, 444, 445, 451, 453, 454, 457, 458, 465, 487-489, 492, 500, 512, 547, 552, 577, 578, 613, 622, 623, 704, 730, 732, 752, 754
Priestley, 763
Puzos, 286

Quain, 19

Rahenan, 283
Rainey, 19
Rampley, 424
Ramsbotham, 13, 15, 21
Rapin, 497
Reamy, 279, 280
Récamier, 550
Reeves, 106, 446, 549, 552, 759, 760

Régnier, 144, 177, 463
Reichert, 29
Reverdin, 78, 80, 434, 439, 755
Rheinstädter, 327, 736
Richelot, L. G., 547, 552
Richet, A., 14
Richolet, 283, 548
Rieder, 763
Robinson, 140, 412
Rohé, 628
Rokitanski, 285, 581, 732, 847
Rosenlein, 514
Rosthorn, 667
Rouget, 29
Routh, C. H. F., 236, 388, 390, 621, 641, 642
Routh, A., 744, 846, 855
Roux, 547
Ruge, C., 247, 317, 339, 512, 521, 533
Ruine, 674
Russell, D. W. W., 579, 798
Rutenberg, 772
Ryall, 819

Sanchez, 334
Sänger, M., 33, 240, 243, 246, 283, 361-364, 438, 441, 488, 504, 620, 735, 736
Santesson, 764
Sappey, 14
Savage, 36, 626
Scanzoni, F. W. von, 52, 323, 339, 700, 757
Schacht, 246
Schäffer, 849
Schanta, F., 362, 514
Schede, 362
Scheurlen, 513
Schlange, 461
Schmorl, 500, 504
Schonend, 680
Schreiber, 867
Schröder, 20, 22, 86, 209, 222, 235, 250, 251, 281, 282, 287, 339, 346, 350, 366, 372, 373, 392, 397, 400, 436, 441, 453, 464-466, 472, 477, 488, 492, 513, 517, 541, 545-549, 704, 706, 736
Schüller, 642
Schultze, B. S., 15, 16, 33, 232
Schwartz, 344
Segond, 362, 493
Senger, 513
Shattock, 513
Simon, 5, 90, 108, 109, 277, 278, 543, 716, 772, 788, 819
Simpson, A. R., 736
Simpson, J. Y. (sound), 58
Simpson (Philadelphia), 738
Simpson, Sir J., 388, 514, 519, 533, 758
Sims, Marion, 4, 18, 44, 54, 56, 58, 76, 115, 171, 189, 213, 214, 216, 218, 224, 225, 265, 267, 268, 275, 277, 280-282, 322, 335-337, 346, 542, 544, 688, 689, 691, 696, 720, 785, 788, 840
Sinclair, 246, 548
Sinéty, De, 139, 319, 539, 711
Sirédy, 539
Skene, Alex. J. C., 10, 642, 764
Skene-Goodman, 265, 267
Skutch, 585, 624
Slavjansky, 603
Slimon, W., 103
Smester, 670
Smith, Alfred, 357, 512, 875
Smith, Henry, 830
Smith, Heywood, 60, 75, 80, 598, 609, 613, 650
Smith-Hodge, 220, 232
Smith, J. Greig, 32, 36, 178, 423, 433, 446, 448, 449, 455, 457, 459, 460, 462, 805, 811, 812
Smith, Lapthorn, 856
Smith, Percy, 626
Smith, Pye, 751, 753
Smith, R. T., 626
Smith, Tyler, 24
Smyly, 326, 466
Snegireff, 483
Spanton, 815
Spencer, 508, 509
Spencer Wells, 118, 121, 399, 401, 442, 469, 470, 474, 492, 544, 546, 548, 612, 626, 627, 645, 648, 654, 658-672, 674, 675, 677, 680-682, 807
Spiedelberg, 512, 531
Stirling, 28
Storer, 820
Strassman, 246, 247
Stratz, C. H., 431
Strauss, I., 334, 528
Stroganoff, 726
Sutton, Bland, 25, 28, 139, 142, 380, 499, 563, 566, 567, 576, 585, 588, 592, 631-635, 637, 639, 640
Sutton, Stainsbury, 564
Swain, James, 356

Taggert, 574
Tait, 26, 79, 80, 142, 264, 268, 269, 272, 399, 401, 416, 431, 432, 447, 450, 451, 454, 455, 458, 476, 492, 564, 573, 577, 603, 612, 619, 626,

645, 650, 669, 675, 676, 678, 684, 699, 733, 764
Tarnier, 407, 749
Tarnovsky, 727
Tay, 103
Taylor, J. C., 274, 452, 453, 614
Terrier, F., 243, 244, 246, 286, 492, 547
Terrillon, O., 492
Thiede, 512
Thiersch, 514
Thin, 743
Thomas, Gaillard, 202, 206, 209, 210, 224, 250, 289, 290, 292, 323, 330, 370, 381, 512, 643, 691, 708, 713, 733
Thompson, Sir H., 128
Thornton, Knowsley, 806, 808, 809
Threadgale, 377
Thum, 143
Tillaux, P., 685
Tisey, 158
Toledo, 334
Toupet, 507
Trendelenburg, 47, 424, 443
Tripier, A., 846
Trommer, 67
Tuke, Hack, 626
Tyler, Smith. See Smith

Unna, 733, 740

Van Bruen, 835
Van Hook, 800
Veit, J., 317, 339, 389, 432, 478, 479, 512, 521, 533
Velits, 667
Velpeau, 460
Verneuil, 547, 833
Virchow, R., 373, 391, 392, 513, 521
Voigt, 667
Volkman, 543
Vullict, 215, 269, 542

Wahl, 461
Waldeyer, 139, 514, 521, 530
Wallace, 353, 354
Walter, 587, 635, 649
Walters, 509
Walton, 139, 313
Warburg, 313
Wathan, 78, 80
Watson, Morrison, 32
Webster, Clarence, 389
Webster, J. C., 735
Wells, Spencer. See Spencer Wells
White, 291, 292
Wickham, 515
Wilks, 39, 626
Williams, 548, 576
Williams (Baltimore), 617
Williams, J., 29, 184, 503, 519, 523
Williams, Roger, 517, 518
Williams, Whitridge, 505
Williams, Wynn, 217, 220, 544
Wills, 726
Wilson, 739
Winckel, F., 512, 567, 765, 773
Winter, G., 247, 502, 547, 857
Wölffler, 560
Wölfler-Hacker, 438, 441, 477, 478, 488

Ziemssen, 182
Zoster, H., 734
Zuckerkandl, Emile, 547, 560, 620
Zwanck, 254, 257
Zweifel, P., 362, 439, 493, 731
Zweighaum, 499

LIST OF APPLIANCES.

Abdominal supports, 160, 816
Adjuster, Bozeman's, 720, 721
Aspirating needles, 72
Aspirating sucker, 676
Aspirators, 72
Batteries, 75, 176, 851, 853, 854
Belts, 816
Bistoury in hæmatocele, 123
Blunt hook, 719
Bougies, Author's, 77
Button-hole scissors, 769
Calibrator (Kelly's), 5
Cannula (Atthill's), 111
Catheters, 107, 109, 789
  self-retaining, 265
  ureteral, 789
Cautery:
  battery, 115
  handles, 114
  Paquelin's, 113
  porcelain, 114
  scissors (Paquelin), 550
Chlorethyl bottle, 120
Clamps, 681, 831
Cotton-holder, 57, 111
Couches, chairs, and tables, 45-49
Crucible, 131
Crutches, 45
Curette:
  flushing, 134
  forceps, 134
  sharp spoon (Simon's), 543
  various forms of, 134
Cystoscope, 771
Dilators:
  Bozeman's, 724
  Duke's, 78
  Hégar's, 77
  irrigating, 78
  Macnaughton-Jones's, 77, 688
  More Madden's, 78
  Reverdin's, 78
Dilators (*continued*)
  sponge, 724
  Tait's, 79
  urethral, 77
  uterine, 78
  Wathan's, 78
Douches, 185, 187
Drainage supports, 724
Drainage-tube:
  of Keith, 675
  of Tait, 675
Ecraseurs, 543
Elastic ligature, 455
  tourniquet, 451
Electric batteries, 175, 176, 851, 853, 854
  cauterization electrode, 855
  exciters, 852
  galvanometer, 854
  rheostat, 854
  sounds, 856
  transformer, 114
Elevator, 225, 242
Forceps:
  artery, 241
  broad ligament, 446
  clamp, 681
  curette, 134
  cyst, 475, 671, 673
  dressing, 58
  fistula, 717
  Greig Smith's peritoneum, 462
  Hégar's, for pedicle, 432
  Jessett's broad ligament, 485, 557
  Kelly's toothed, 789
  Kœberlé's, 673
  morcellement, 475
  Nélaton's, 671
  ovum, 75
  Péan's cyst, 475
  peritoneum, 462
  pile, 829

Forceps (*continued*)
pressure, 446
Rampley's sponge-holding, 424
Reeves' hysterectomy, 446
short pedicle, 673
speculum, 58
tent, 72
toothed and serrated, 475
Wells' torsion, 670
Fork, pile, 829
Funnels, 123, 124
Guard, Maunsell's, 449
Guide, wire, 717
Hall's lancet, 112
Inhalers, 70
Injector, 130
Insufflators, 344
Intra-uterine medicators (various), 130
Irrigating mug, 669
Irrigator (Leiter's), 609
Jacket and leg-rest (Dowd's), 263
Kidney belts, 816
Knives:
Hall's, 112
Sims', 117
vesico-vaginal, 717
Lancet, Hall's, 112
Ligature tractor, 823
Medicator, intra-uterine, 128, 130
Needle-holders, 245, 268, 337, 677
Needles, 268, 337, 433, 434, 557, 716, 717
Obturator, bivalve vaginal, Jessett's, 485
Obturator, Kelly's, 774
Ophthalmoscope, 100
Paquelin's cautery. See Cautery
Pedicle pins, 456
Perinæal supports, 260, 261
Perrier's amputation appliance, 295
Pessaries:
Bantock's stem, 217
Blackbee's, 205
Braun's colpeurynter, 259
celluloid ring, 231
Chambers' stem, 219
Fowler's, 208
Galabin's, 205
Gehrung's, 207
glycerine pad, 229
glycerine ring, 235
Godson's modification of Zwanck, 258
Gordon Black's stem, 217
Hewitt's cradle, 207
stem, 217
Hodge's, varieties of, 229, 232
inflating, 260
Pessaries (*continued*)
Napier's prolapsus, 259
Routh's buckle pessary, 236
Smith-Hodge, 229, 232
watch-spring, 232
Wynn Williams' stem, 217
Zwanck's, 257
Piles:
clamp, 831
forceps, 829
fork, 829
scissors, 827
Polyptome, Author's, 389
Positors, rectal, 838
Probe, Sims' pliable, 58
rectal, 822
Rectum:
instruments for operations on, 829, 831
positors, 838
Reels for sutures and ligatures, 426
Repositors:
Author's, 225
for inverted uterus, 294
uterine, 205, 225
Rest, vaginal (Sims'), 688
Retractors, 109, 443, 444
Scissors:
bent, 673, 829
button-hole, 769
cautery, 550
dissecting, 422
Emmet's angular or curved, 717
Heywood Smith's, 80
Kuchenmeister's, 116
pile, 827, 829
Sims' elbow, 337
Sims', 265
vesico-vaginal, 717
Scoop, 543
Screw, Tait's hysterectomy, 447
Searcher, ureteral, 789
Serre-nœuds:
Kœberlé's, 450
Tait's, 456
Snap-catch, Jessett's, 485, 486
Sounds:
irrigating, 59
uterine, 58
Specula:
Barnes', 54
bath, 56
Coxeter's electric light, 55
Fergusson's, 55
Hall Davies', 53
Kelly's, 774, 776
Macnaughton-Jones' demonstration, 59

Specula (*continued*)
Neugebaur's, 55
rectal, 107, 819
Gowland's, 107
Lane's, 107
Ryall's, 819
Sims', 54
tubular, 1
urethral, 774, 775
Kelly's, 775
Reeves', 759
various forms of, 53-56, 59
Speculum-slice, 109
Sponge-holder, 57
Spoon, Volkmann's, 543
Spray, chlorethyl, 120
Stem:
Author's, 117
Bantock's, 217
Black's, 217
Chambers', 217
Duke's intra-uterine, 118
Hewitt's, 217
Wynn Williams', 217
Sterilizer, 425
Stethoscope, 51
Sucker, Kelly's, 775
Supports:
abdominal, 160
for movable kidney, 816
for legs, 262, 263
Suture-holder and needle (Greigsmith's), 433
Sutures, 425-434
Syphon rectal feeding-tube, 124
Syphon trocar, Tait's, 676
Syringes:
Higginson's, 108
rectal, 108
vaginal, 108
Tables, operation:
Czempin's, 45
Delajenière's, 47
Tables (*continued*)
Doléris', 49
Greig Smith's, 423
Jessett's, 49
Trendelenburg's, 47
Tait's corkscrew, 447
Tampon introducer, 75
Temperature coil, Leiter's, 312
Tenaculum, Sims', 58
Tent introducer, 75
Tents, 73, 74
Thermometer, clinical, 67
Tourniquet:
Pozzi's, 451
Tait's temporary rope, 450
Transformer, 114
Trocar:
Atthill's, 111
Tait's, 676
Wells', 119, 671
Ureteral instruments (Howard Kelly's):
catheters, 789
forceps, 789
searcher, 789
specula, 774, 775
Urethral instruments:
button-hole scissors, 769
calibrator, 5, 774
catheters, 789
dilators, 77
specula, 759
Uterine, 58
Uterine probes, 58
Vaginal rest, 688
Vaginal sponge dilator, 724
Vesico-vaginal fistula instruments, 717
Vulsellum, 386
Wire-conductor, 388
Wire-twister, 719, 720
Wool-holder, 111

THE END.

Baillière, Tindall & Cox, 20 and 21, King William Street, Strand.